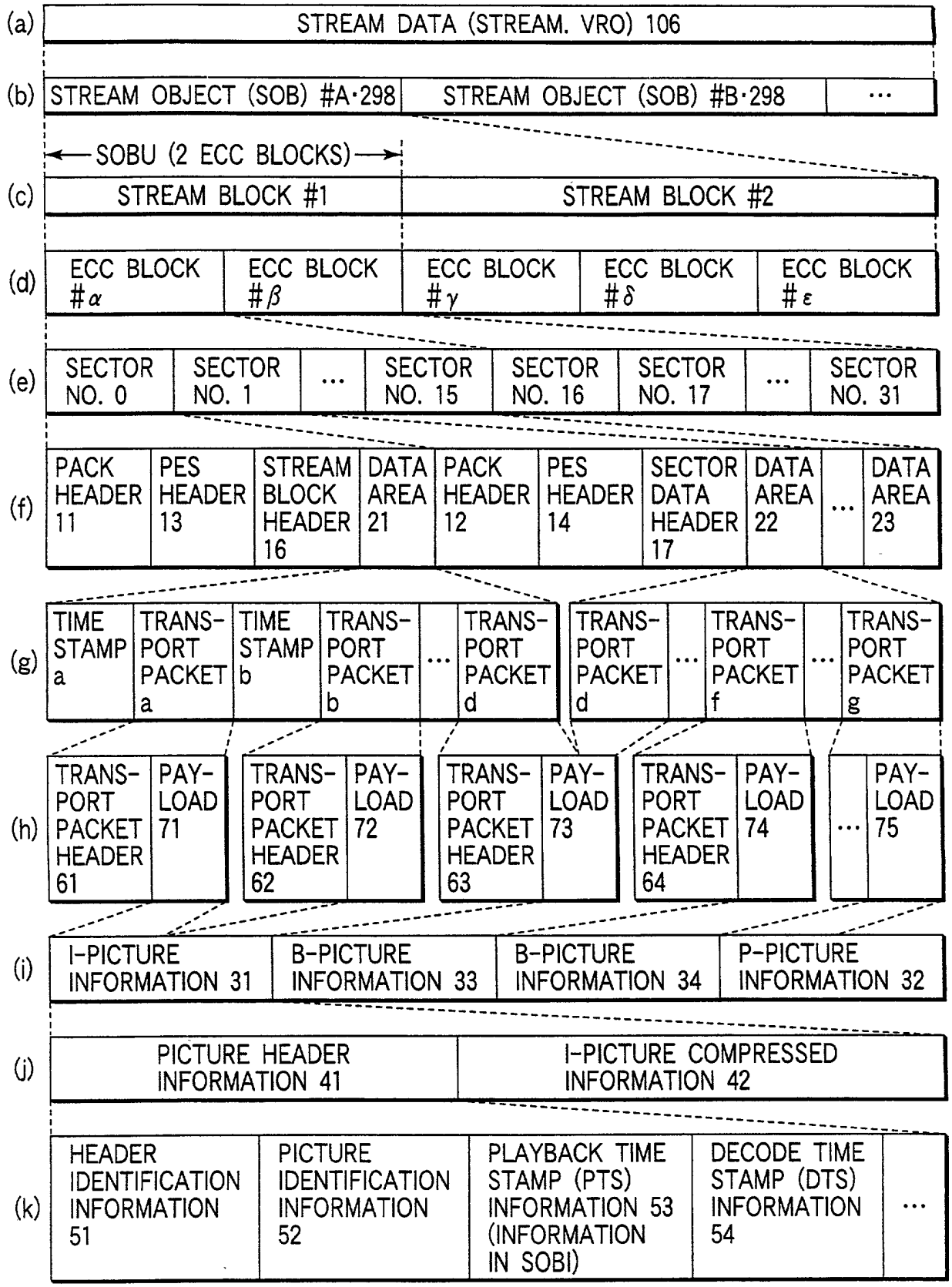

(a)
STREAM DATA (STREAM. VRO) 106
(b)
STREAM OBJECT (SOB) #A·298
STREAM OBJECT (SOB) #B·298
...
SOBU (2 ECC BLOCKS)
(c)
STREAM BLOCK #1
STREAM BLOCK #2
(d)
ECC BLOCK #α
ECC BLOCK #β
ECC BLOCK #γ
ECC BLOCK #δ
ECC BLOCK #ε
(e)
SECTOR NO. 0
SECTOR NO. 1
...
SECTOR NO. 15
SECTOR NO. 16
SECTOR NO. 17
...
SECTOR NO. 31
(f)
PACK HEADER 11
PES HEADER 13
STREAM BLOCK HEADER 16
DATA AREA 21
PACK HEADER 12
PES HEADER 14
SECTOR DATA HEADER 17
DATA AREA 22
...
DATA AREA 23
(g)
TIME STAMP a
TRANS-PORT PACKET a
TIME STAMP b
TRANS-PORT PACKET b
...
TRANS-PORT PACKET d
TRANS-PORT PACKET d
...
TRANS-PORT PACKET f
...
TRANS-PORT PACKET g
(h)
TRANS-PORT PACKET HEADER 61
PAY-LOAD 71
TRANS-PORT PACKET HEADER 62
PAY-LOAD 72
TRANS-PORT PACKET HEADER 63
PAY-LOAD 73
TRANS-PORT PACKET HEADER 64
PAY-LOAD 74
...
PAY-LOAD 75
(i)
I-PICTURE INFORMATION 31
B-PICTURE INFORMATION 33
B-PICTURE INFORMATION 34
P-PICTURE INFORMATION 32
(j)
PICTURE HEADER INFORMATION 41
I-PICTURE COMPRESSED INFORMATION 42
(k)
HEADER IDENTIFICATION INFORMATION 51
PICTURE IDENTIFICATION INFORMATION 52
PLAYBACK TIME STAMP (PTS) INFORMATION 53 (INFORMATION IN SOBI)
DECODE TIME STAMP (DTS) INFORMATION 54
...

FIG. 1

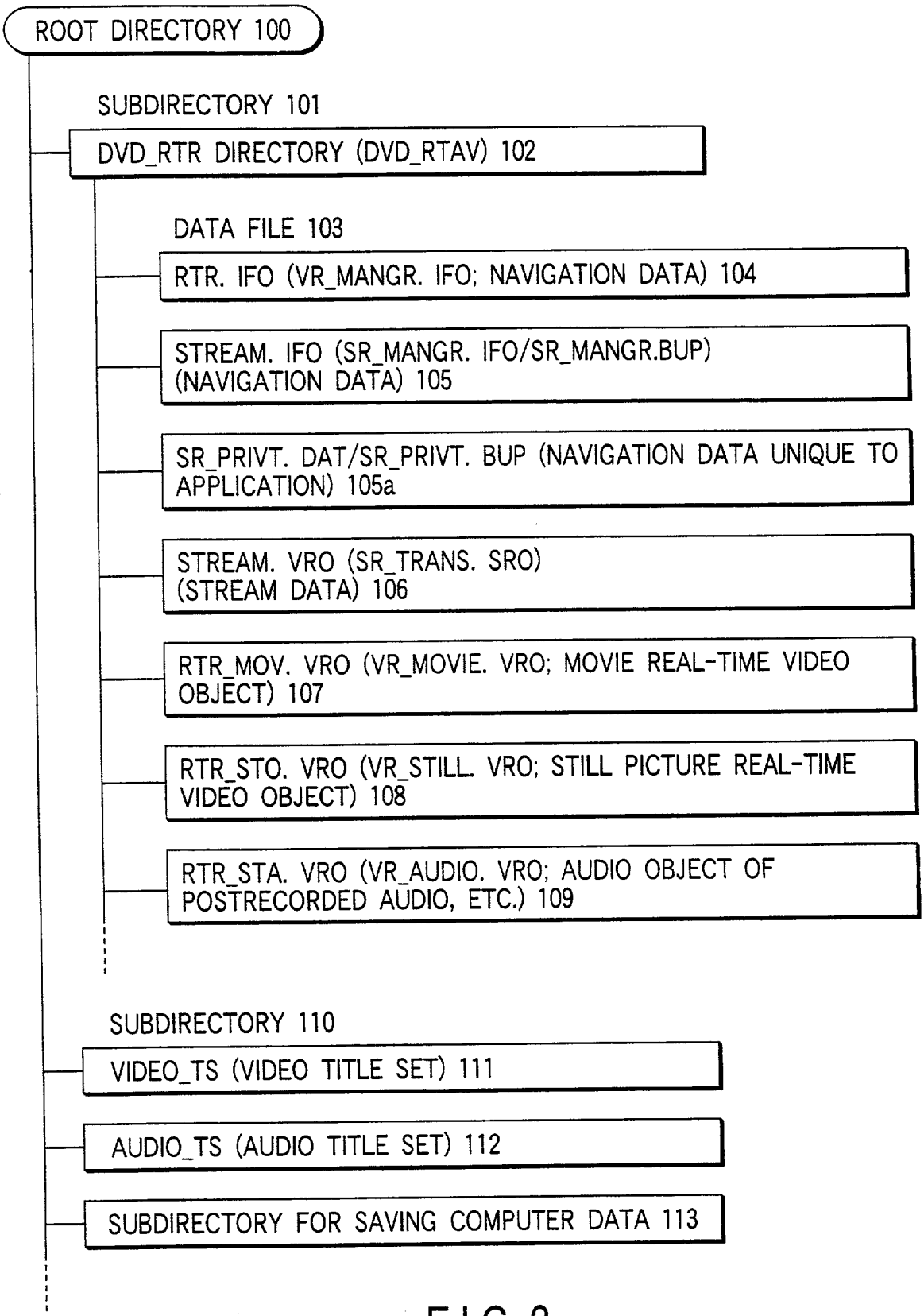
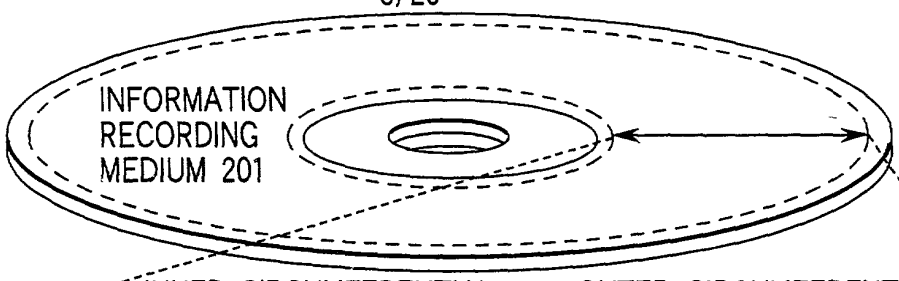

ROOT DIRECTORY 100
SUBDIRECTORY 101
DVD_RTR DIRECTORY (DVD_RTAV) 102
DATA FILE 103
RTR. IFO (VR_MANGR. IFO; NAVIGATION DATA) 104
STREAM. IFO (SR_MANGR. IFO/SR_MANGR.BUP) (NAVIGATION DATA) 105
SR_PRIVT. DAT/SR_PRIVT. BUP (NAVIGATION DATA UNIQUE TO APPLICATION) 105a
STREAM. VRO (SR_TRANS. SRO) (STREAM DATA) 106
RTR_MOV. VRO (VR_MOVIE. VRO; MOVIE REAL-TIME VIDEO OBJECT) 107
RTR_STO. VRO (VR_STILL. VRO; STILL PICTURE REAL-TIME VIDEO OBJECT) 108
RTR_STA. VRO (VR_AUDIO. VRO; AUDIO OBJECT OF POSTRECORDED AUDIO, ETC.) 109
SUBDIRECTORY 110
VIDEO_TS (VIDEO TITLE SET) 111
AUDIO_TS (AUDIO TITLE SET) 112
SUBDIRECTORY FOR SAVING COMPUTER DATA 113

FIG. 2

(a)



←INNER CIRCUMFERENTIAL DIRECTION 202

OUTER CIRCUMFERENTIAL→ DIRECTION 203

(b)

LEAD-IN AREA (EMBOSS/ REWRITABLE DATA ZONE) 204	VOLUME & FILE STRUCTURE INFORMATION (REWRITABLE DATA ZONE) 206	DATA AREA (REWRITABLE DATA ZONE) 207	LEAD-OUT AREA (REWRITABLE DATA ZONE) 205

(c)

COMPUTER DATA AREA 208	AUDIO & VIDEO DATA AREA 210	COMPUTER DATA AREA 209

(d)

REAL-TIME VIDEO RECORDING AREA 221	STREAM RECORDING AREA 222

(e)

RTR. IFO 104	RTR_MOV. VRO 107	RTR_STO. VRO 108	RTR_STA. VRO 109	STREAM. IFO 105	STRAM. VRO 106

(f)

VIDEO MANAGER (VMGI/STR _VMGI) 231	STREAM FILE INFORMA-TION TABLE (SFIT) 232	ORIGINAL PGC INFORMATION (ORG_PGCI) 233	USER-DEFINED PGC INFOR-MATION TABLE (UD_ PGCIT) 234	TEXT DATA MANAGER (TXTDT_ MG) 235	MANUFAC-TURER INFORMATION TABLE (MNFIT/ APDT_MG) 236

(g)

STREAM FILE INFORMATION TABLE INFORMATION (SFITI) 241	STREAM OBJECT INFOR-MATION (SOBI) #A·242	STREAM OBJECT INFOR-MATION (SOBI) #B·243	...	ORIGINAL PGC GENERAL INFOR-MATION 271	ORIGINAL CELL INFOR-MATION #1·272	ORIGINAL CELL INFOR-MATION #2·273	...

(h)

STREAM OBJECT GENERAL INFORMATION (SOBI_GI) 251	TIME MAP INFOR-MATION 252	...

CELL TYPE 281	CELL ID 282	CORRES-PONDING CELL START TIME 283	CORRES-PONDING CELL END TIME 284	PTS OFF-SET 9	TIME RELATI-ONSHIP TABLE 2

(i)

STREAM BLOCK NUMBER 261	FIRST STREAM BLOCK SIZE 262	FIRST STREAM BLOCK TIME DIFFERENCE 263	SECOND STREAM BLOCK SIZE 264	SECOND STREAM BLOCK TIME DIFFERENCE 265	...

FIG. 3

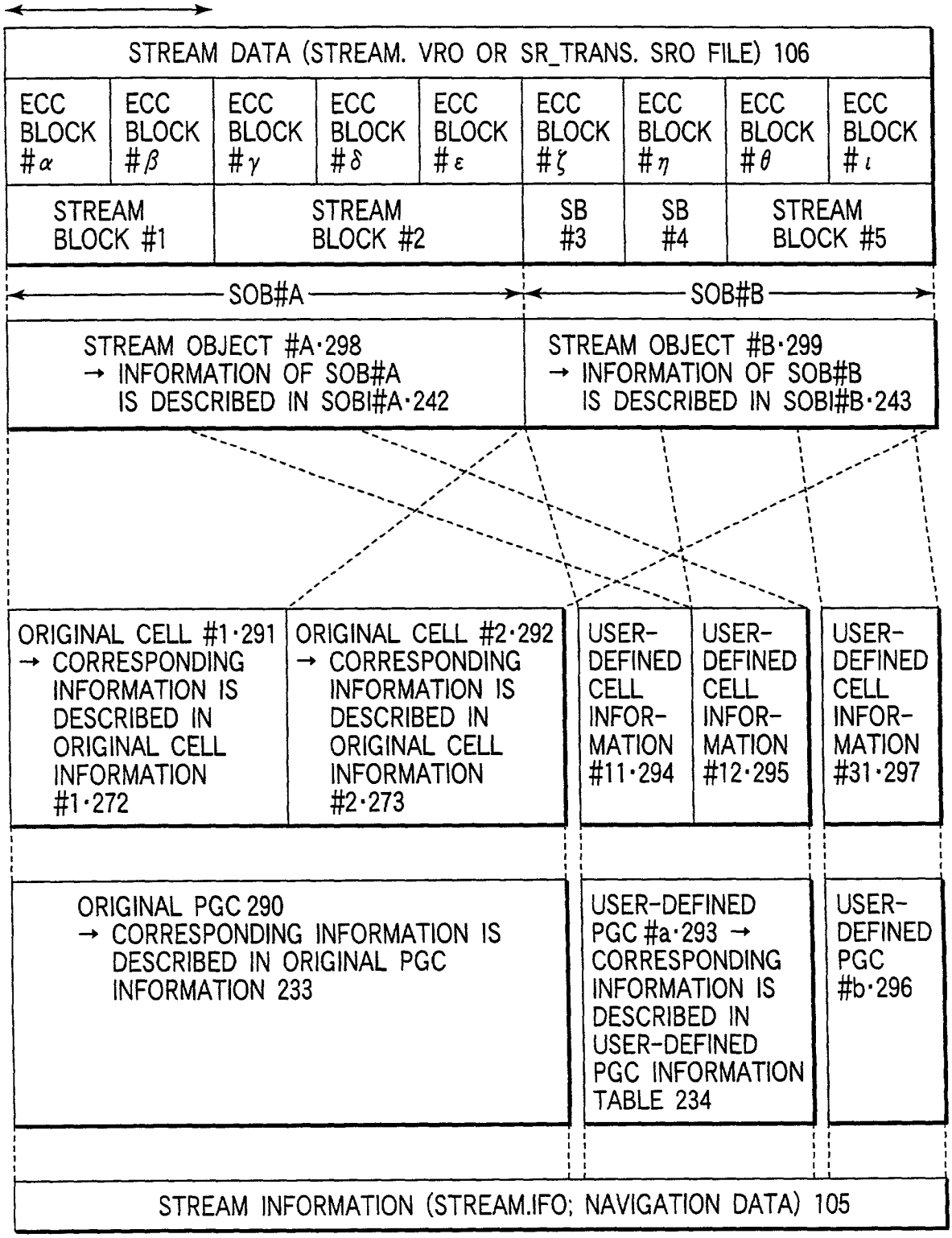

2 ECC BLOCKS (32 SECTORS) =
1 STREAM OBJECT UNIT (SOBU)
STREAM DATA (STREAM. VRO OR SR_TRANS. SRO FILE) 106
ECC BLOCK #α
ECC BLOCK #β
ECC BLOCK #γ
ECC BLOCK #δ
ECC BLOCK #ε
ECC BLOCK #ζ
ECC BLOCK #η
ECC BLOCK #θ
ECC BLOCK #ι
STREAM BLOCK #1
STREAM BLOCK #2
SB #3
SB #4
STREAM BLOCK #5
SOB#A
SOB#B
STREAM OBJECT #A·298 → INFORMATION OF SOB#A IS DESCRIBED IN SOBI#A·242
STREAM OBJECT #B·299 → INFORMATION OF SOB#B IS DESCRIBED IN SOBI#B·243
ORIGINAL CELL #1·291 → CORRESPONDING INFORMATION IS DESCRIBED IN ORIGINAL CELL INFORMATION #1·272
ORIGINAL CELL #2·292 → CORRESPONDING INFORMATION IS DESCRIBED IN ORIGINAL CELL INFORMATION #2·273
USER-DEFINED CELL INFOR-MATION #11·294
USER-DEFINED CELL INFOR-MATION #12·295
USER-DEFINED CELL INFOR-MATION #31·297
ORIGINAL PGC 290 → CORRESPONDING INFORMATION IS DESCRIBED IN ORIGINAL PGC INFORMATION 233
USER-DEFINED PGC #a·293 → CORRESPONDING INFORMATION IS DESCRIBED IN USER-DEFINED PGC INFORMATION TABLE 234
USER-DEFINED PGC #b·296
STREAM INFORMATION (STREAM.IFO; NAVIGATION DATA) 105

FIG. 4

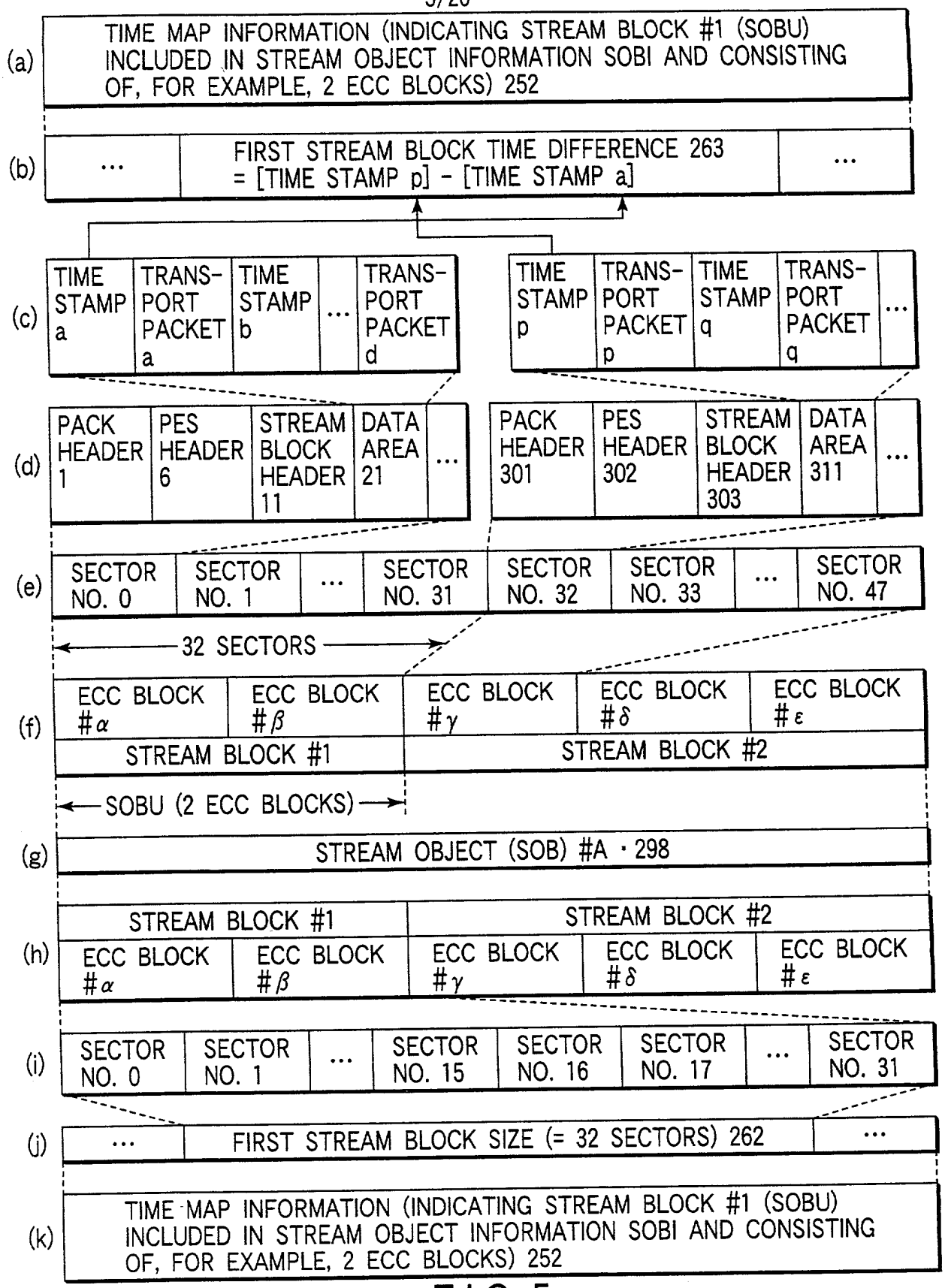

(a)
TIME MAP INFORMATION (INDICATING STREAM BLOCK #1 (SOBU) INCLUDED IN STREAM OBJECT INFORMATION SOBI AND CONSISTING OF, FOR EXAMPLE, 2 ECC BLOCKS) 252
(b)
...
FIRST STREAM BLOCK TIME DIFFERENCE 263 = [TIME STAMP p] - [TIME STAMP a]
...
(c)
TIME STAMP a
TRANS-PORT PACKET a
TIME STAMP b
...
TRANS-PORT PACKET d
TIME STAMP p
TRANS-PORT PACKET p
TIME STAMP q
TRANS-PORT PACKET q
...
(d)
PACK HEADER 1
PES HEADER 6
STREAM BLOCK HEADER 11
DATA AREA 21
...
PACK HEADER 301
PES HEADER 302
STREAM BLOCK HEADER 303
DATA AREA 311
...
(e)
SECTOR NO. 0
SECTOR NO. 1
...
SECTOR NO. 31
SECTOR NO. 32
SECTOR NO. 33
...
SECTOR NO. 47
32 SECTORS
(f)
ECC BLOCK #α
ECC BLOCK #β
ECC BLOCK #γ
ECC BLOCK #δ
ECC BLOCK #ε
STREAM BLOCK #1
STREAM BLOCK #2
SOBU (2 ECC BLOCKS)
(g)
STREAM OBJECT (SOB) #A · 298
(h)
STREAM BLOCK #1
STREAM BLOCK #2
ECC BLOCK #α
ECC BLOCK #β
ECC BLOCK #γ
ECC BLOCK #δ
ECC BLOCK #ε
(i)
SECTOR NO. 0
SECTOR NO. 1
...
SECTOR NO. 15
SECTOR NO. 16
SECTOR NO. 17
...
SECTOR NO. 31
(j)
...
FIRST STREAM BLOCK SIZE (= 32 SECTORS) 262
...
(k)
TIME MAP INFORMATION (INDICATING STREAM BLOCK #1 (SOBU) INCLUDED IN STREAM OBJECT INFORMATION SOBI AND CONSISTING OF, FOR EXAMPLE, 2 ECC BLOCKS) 252

FIG. 5

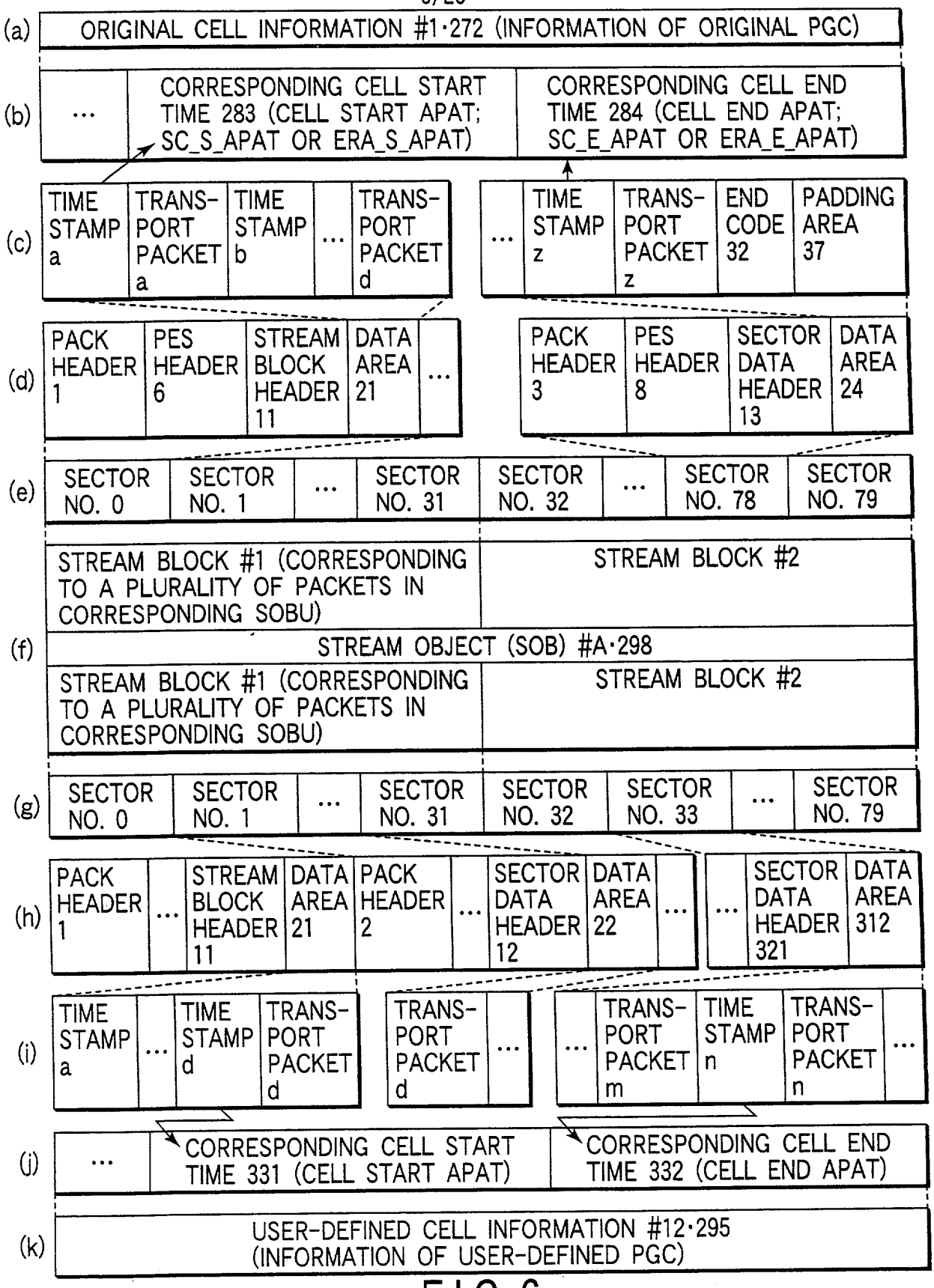

(a)
ORIGINAL CELL INFORMATION #1·272 (INFORMATION OF ORIGINAL PGC)
(b)
...
CORRESPONDING CELL START TIME 283 (CELL START APAT; SC_S_APAT OR ERA_S_APAT)
CORRESPONDING CELL END TIME 284 (CELL END APAT; SC_E_APAT OR ERA_E_APAT)
(c)
TIME STAMP a
TRANS-PORT PACKET a
TIME STAMP b
...
TRANS-PORT PACKET d
...
TIME STAMP z
TRANS-PORT PACKET z
END CODE 32
PADDING AREA 37
(d)
PACK HEADER 1
PES HEADER 6
STREAM BLOCK HEADER 11
DATA AREA 21
...
PACK HEADER 3
PES HEADER 8
SECTOR DATA HEADER 13
DATA AREA 24
(e)
SECTOR NO. 0
SECTOR NO. 1
...
SECTOR NO. 31
SECTOR NO. 32
...
SECTOR NO. 78
SECTOR NO. 79
STREAM BLOCK #1 (CORRESPONDING TO A PLURALITY OF PACKETS IN CORRESPONDING SOBU)
STREAM BLOCK #2
(f)
STREAM OBJECT (SOB) #A·298
STREAM BLOCK #1 (CORRESPONDING TO A PLURALITY OF PACKETS IN CORRESPONDING SOBU)
STREAM BLOCK #2
(g)
SECTOR NO. 0
SECTOR NO. 1
...
SECTOR NO. 31
SECTOR NO. 32
SECTOR NO. 33
...
SECTOR NO. 79
(h)
PACK HEADER 1
...
STREAM BLOCK HEADER 11
DATA AREA 21
PACK HEADER 2
...
SECTOR DATA HEADER 12
DATA AREA 22
...
...
SECTOR DATA HEADER 321
DATA AREA 312
(i)
TIME STAMP a
...
TIME STAMP d
TRANS-PORT PACKET d
TRANS-PORT PACKET d
...
...
TRANS-PORT PACKET m
TIME STAMP n
TRANS-PORT PACKET n
...
(j)
...
CORRESPONDING CELL START TIME 331 (CELL START APAT)
CORRESPONDING CELL END TIME 332 (CELL END APAT)
(k)
USER-DEFINED CELL INFORMATION #12·295 (INFORMATION OF USER-DEFINED PGC)

FIG. 6

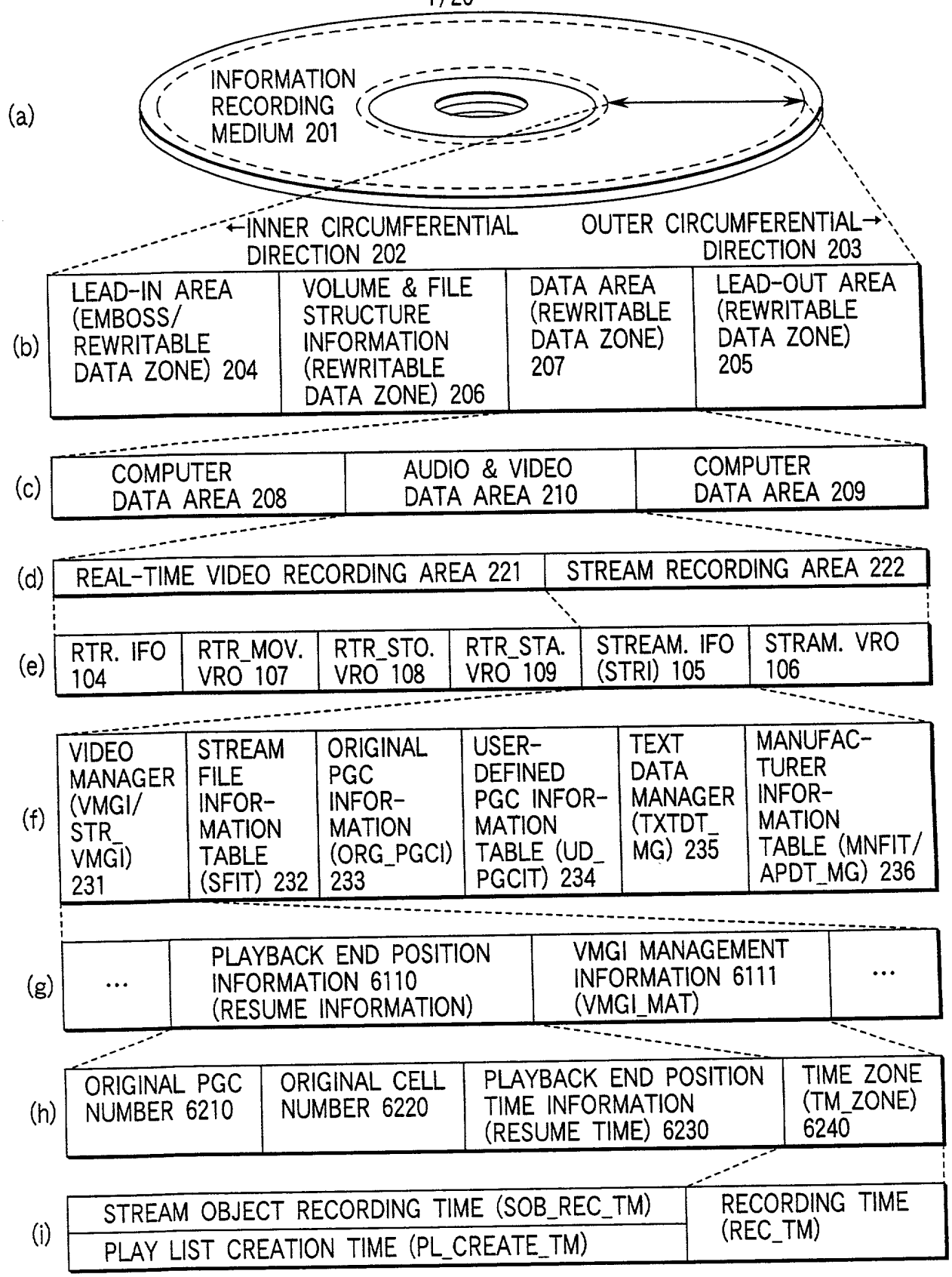

(a)
INFORMATION RECORDING MEDIUM 201
←INNER CIRCUMFERENTIAL DIRECTION 202
OUTER CIRCUMFERENTIAL→ DIRECTION 203
(b)
LEAD-IN AREA (EMBOSS/ REWRITABLE DATA ZONE) 204
VOLUME & FILE STRUCTURE INFORMATION (REWRITABLE DATA ZONE) 206
DATA AREA (REWRITABLE DATA ZONE) 207
LEAD-OUT AREA (REWRITABLE DATA ZONE) 205
(c)
COMPUTER DATA AREA 208
AUDIO & VIDEO DATA AREA 210
COMPUTER DATA AREA 209
(d)
REAL-TIME VIDEO RECORDING AREA 221
STREAM RECORDING AREA 222
(e)
RTR. IFO 104
RTR_MOV. VRO 107
RTR_STO. VRO 108
RTR_STA. VRO 109
STREAM. IFO (STRI) 105
STRAM. VRO 106
(f)
VIDEO MANAGER (VMGI/ STR_ VMGI) 231
STREAM FILE INFOR- MATION TABLE (SFIT) 232
ORIGINAL PGC INFOR- MATION (ORG_PGCI) 233
USER- DEFINED PGC INFOR- MATION TABLE (UD_ PGCIT) 234
TEXT DATA MANAGER (TXTDT_ MG) 235
MANUFAC- TURER INFOR- MATION TABLE (MNFIT/ APDT_MG) 236
(g)
...
PLAYBACK END POSITION INFORMATION 6110 (RESUME INFORMATION)
VMGI MANAGEMENT INFORMATION 6111 (VMGI_MAT)
...
(h)
ORIGINAL PGC NUMBER 6210
ORIGINAL CELL NUMBER 6220
PLAYBACK END POSITION TIME INFORMATION (RESUME TIME) 6230
TIME ZONE (TM_ZONE) 6240
(i)
STREAM OBJECT RECORDING TIME (SOB_REC_TM)
PLAY LIST CREATION TIME (PL_CREATE_TM)
RECORDING TIME (REC_TM)

FIG. 7

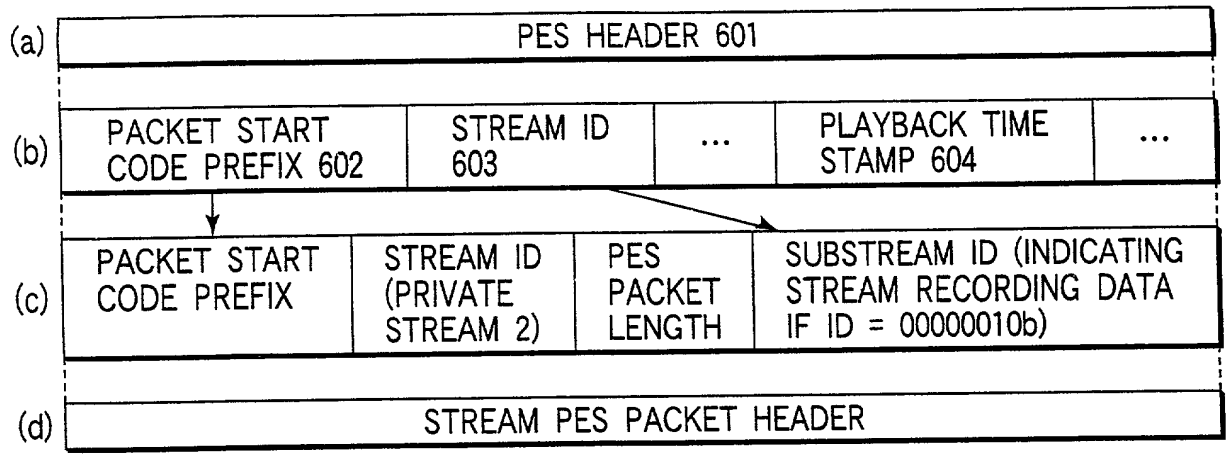

(a)
PES HEADER 601
(b)
PACKET START CODE PREFIX 602
STREAM ID 603
...
PLAYBACK TIME STAMP 604
...
(c)
PACKET START CODE PREFIX
STREAM ID (PRIVATE STREAM 2)
PES PACKET LENGTH
SUBSTREAM ID (INDICATING STREAM RECORDING DATA IF ID = 00000010b)
(d)
STREAM PES PACKET HEADER

FIG. 8

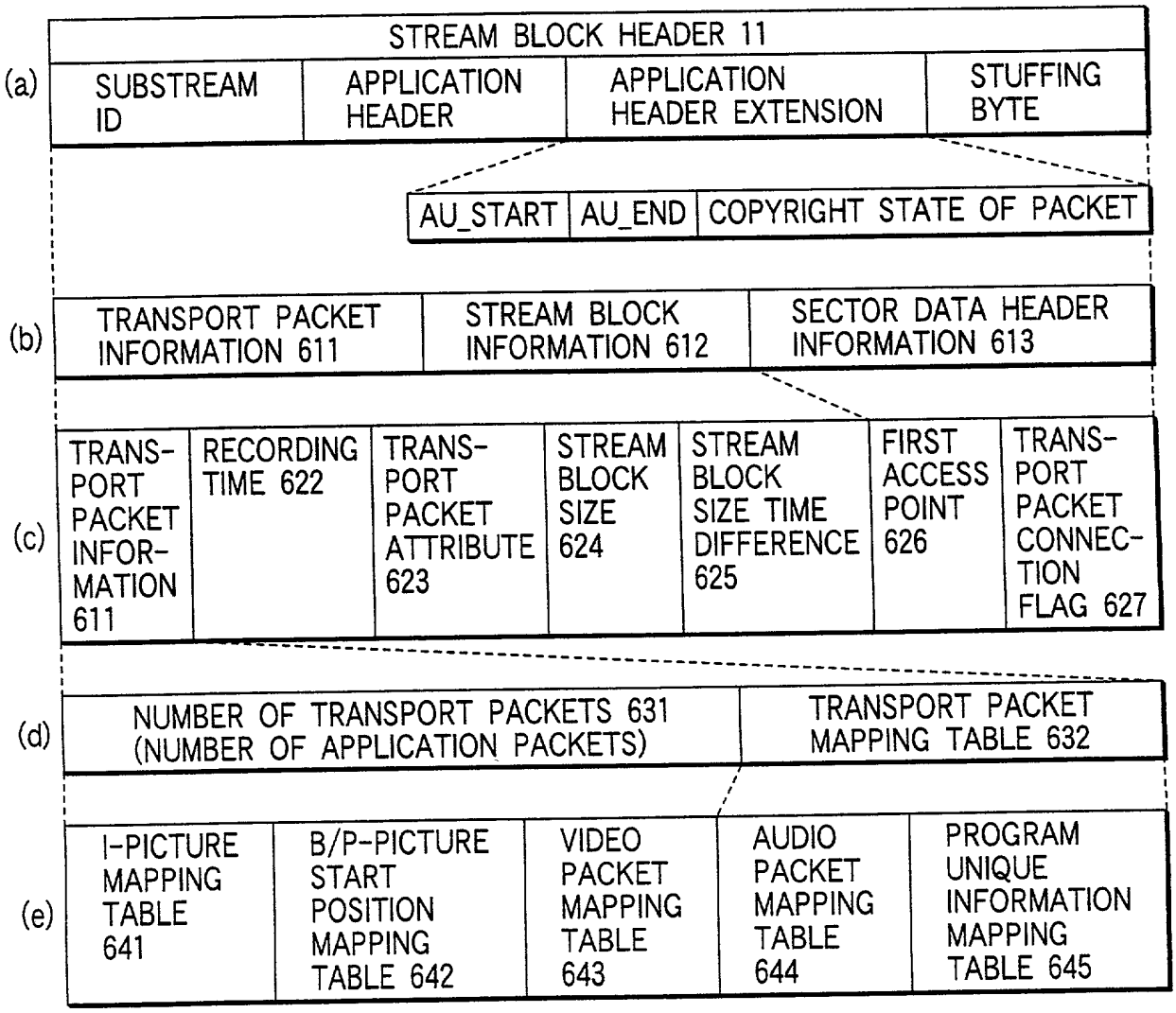

STREAM BLOCK HEADER 11
(a)
SUBSTREAM ID
APPLICATION HEADER
APPLICATION HEADER EXTENSION
STUFFING BYTE
AU_START
AU_END
COPYRIGHT STATE OF PACKET
(b)
TRANSPORT PACKET INFORMATION 611
STREAM BLOCK INFORMATION 612
SECTOR DATA HEADER INFORMATION 613
(c)
TRANS-PORT PACKET INFOR-MATION 611
RECORDING TIME 622
TRANS-PORT PACKET ATTRIBUTE 623
STREAM BLOCK SIZE 624
STREAM BLOCK SIZE TIME DIFFERENCE 625
FIRST ACCESS POINT 626
TRANS-PORT PACKET CONNEC-TION FLAG 627
(d)
NUMBER OF TRANSPORT PACKETS 631 (NUMBER OF APPLICATION PACKETS)
TRANSPORT PACKET MAPPING TABLE 632
(e)
I-PICTURE MAPPING TABLE 641
B/P-PICTURE START POSITION MAPPING TABLE 642
VIDEO PACKET MAPPING TABLE 643
AUDIO PACKET MAPPING TABLE 644
PROGRAM UNIQUE INFORMATION MAPPING TABLE 645

FIG. 9

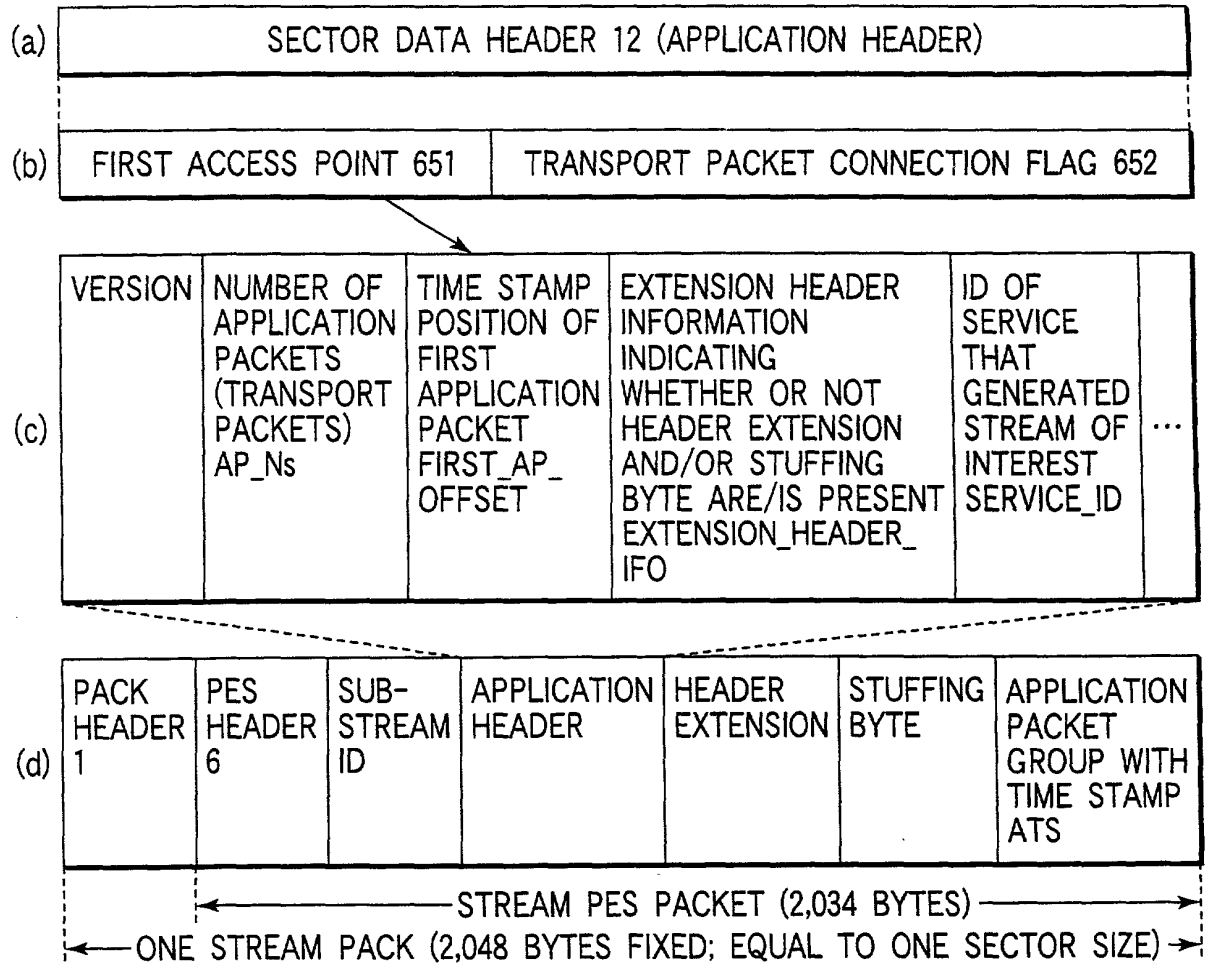


FIG. 10

	FIRST STREAM BLOCK	SECOND STREAM BLOCK
STREAM BLOCK SIZE	FIRST STREAM BLOCK SIZE 262	SECOND STREAM BLOCK SIZE 264
STREAM BLOCK TIME DIFFERENCE	FIRST STREAM BLOCK TIME DIFFERENCE 263	SECOND STREAM BLOCK TIME DIFFERENCE 265
NUMBER OF PACKETS (AP_Ns)	335	328

FIG. 11

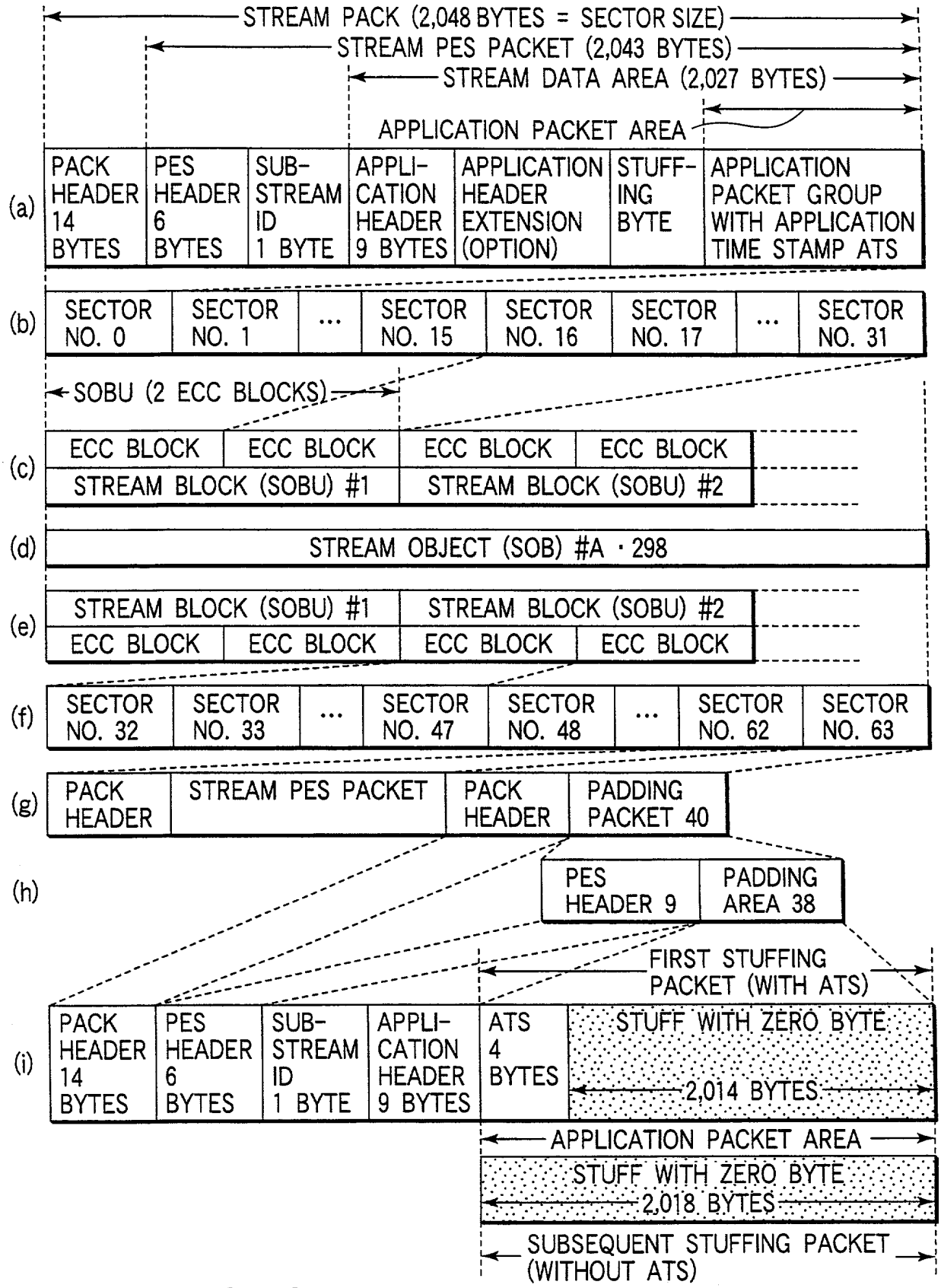

STREAM PACK (2,048 BYTES = SECTOR SIZE)
STREAM PES PACKET (2,043 BYTES)
STREAM DATA AREA (2,027 BYTES)
APPLICATION PACKET AREA
(a)
PACK HEADER 14 BYTES
PES HEADER 6 BYTES
SUB-STREAM ID 1 BYTE
APPLI-CATION HEADER 9 BYTES
APPLICATION HEADER EXTENSION (OPTION)
STUFF-ING BYTE
APPLICATION PACKET GROUP WITH APPLICATION TIME STAMP ATS
(b)
SECTOR NO. 0
SECTOR NO. 1
...
SECTOR NO. 15
SECTOR NO. 16
SECTOR NO. 17
...
SECTOR NO. 31
SOBU (2 ECC BLOCKS)
(c)
ECC BLOCK
STREAM BLOCK (SOBU) #1
STREAM BLOCK (SOBU) #2
(d)
STREAM OBJECT (SOB) #A · 298
(e)
STREAM BLOCK (SOBU) #1
STREAM BLOCK (SOBU) #2
(f)
SECTOR NO. 32
SECTOR NO. 33
SECTOR NO. 47
SECTOR NO. 48
SECTOR NO. 62
SECTOR NO. 63
(g)
PACK HEADER
STREAM PES PACKET
PADDING PACKET 40
(h)
PES HEADER 9
PADDING AREA 38
FIRST STUFFING PACKET (WITH ATS)
(i)
ATS 4 BYTES
STUFF WITH ZERO BYTE
2,014 BYTES
APPLICATION PACKET AREA
2,018 BYTES
SUBSEQUENT STUFFING PACKET (WITHOUT ATS)

FIG. 12

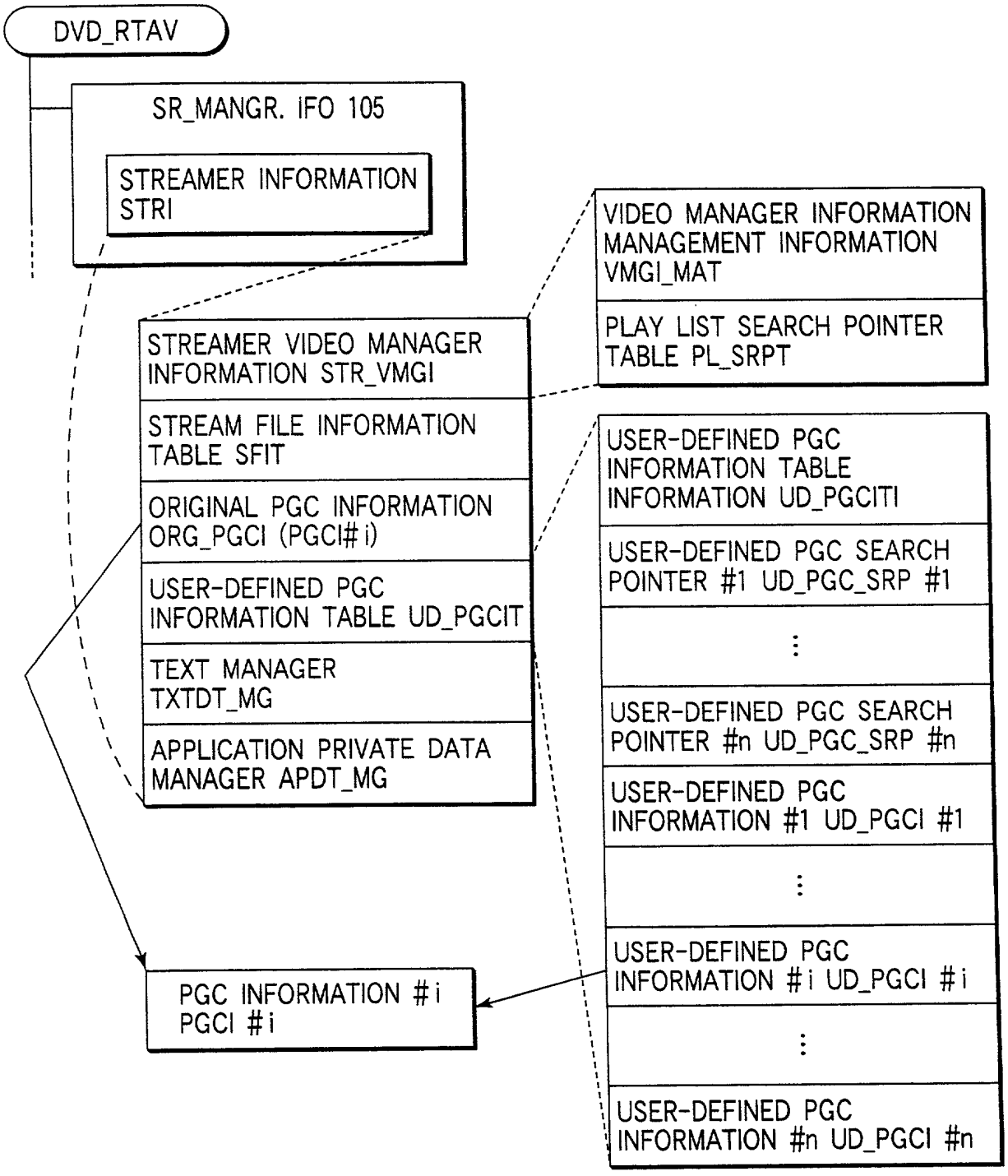

DVD_RTAV
SR_MANGR. IFO 105
STREAMER INFORMATION STRI
STREAMER VIDEO MANAGER INFORMATION STR_VMGI
STREAM FILE INFORMATION TABLE SFIT
ORIGINAL PGC INFORMATION ORG_PGCI (PGCI# i)
USER-DEFINED PGC INFORMATION TABLE UD_PGCIT
TEXT MANAGER TXTDT_MG
APPLICATION PRIVATE DATA MANAGER APDT_MG
VIDEO MANAGER INFORMATION MANAGEMENT INFORMATION VMGI_MAT
PLAY LIST SEARCH POINTER TABLE PL_SRPT
USER-DEFINED PGC INFORMATION TABLE INFORMATION UD_PGCITI
USER-DEFINED PGC SEARCH POINTER #1 UD_PGC_SRP #1
USER-DEFINED PGC SEARCH POINTER #n UD_PGC_SRP #n
USER-DEFINED PGC INFORMATION #1 UD_PGCI #1
USER-DEFINED PGC INFORMATION #i UD_PGCI #i
USER-DEFINED PGC INFORMATION #n UD_PGCI #n
PGC INFORMATION #i PGCI #i

FIG. 13

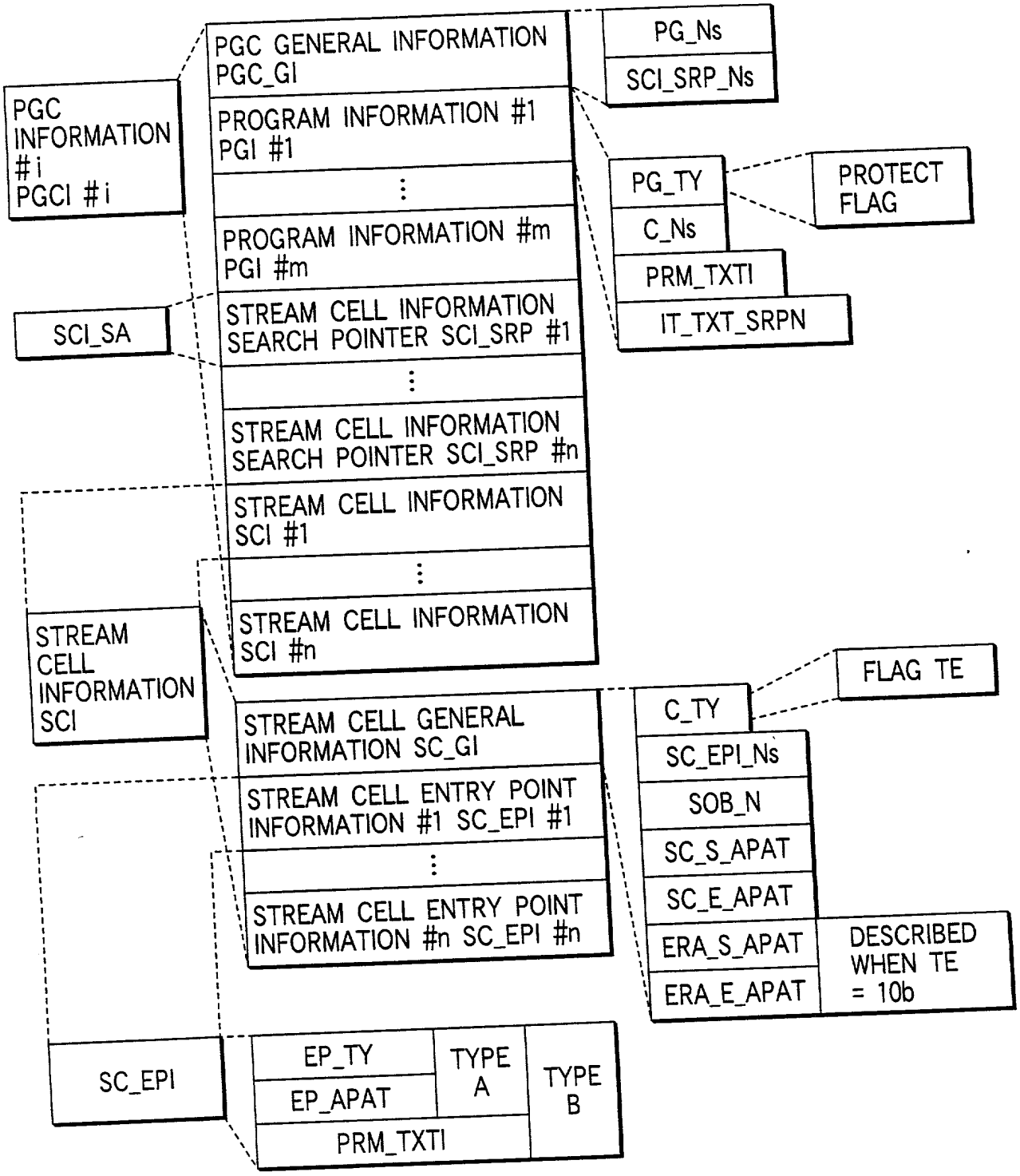

PGC INFORMATION #i PGCI #i
PGC GENERAL INFORMATION PGC_GI
PROGRAM INFORMATION #1 PGI #1
PROGRAM INFORMATION #m PGI #m
PG_Ns
SCI_SRP_Ns
PG_TY
C_Ns
PRM_TXTI
IT_TXT_SRPN
PROTECT FLAG
SCI_SA
STREAM CELL INFORMATION SEARCH POINTER SCI_SRP #1
STREAM CELL INFORMATION SEARCH POINTER SCI_SRP #n
STREAM CELL INFORMATION SCI #1
STREAM CELL INFORMATION SCI #n
STREAM CELL INFORMATION SCI
STREAM CELL GENERAL INFORMATION SC_GI
STREAM CELL ENTRY POINT INFORMATION #1 SC_EPI #1
STREAM CELL ENTRY POINT INFORMATION #n SC_EPI #n
C_TY
FLAG TE
SC_EPI_Ns
SOB_N
SC_S_APAT
SC_E_APAT
ERA_S_APAT
ERA_E_APAT
DESCRIBED WHEN TE = 10b
SC_EPI
EP_TY
EP_APAT
PRM_TXTI
TYPE A
TYPE B

FIG. 14

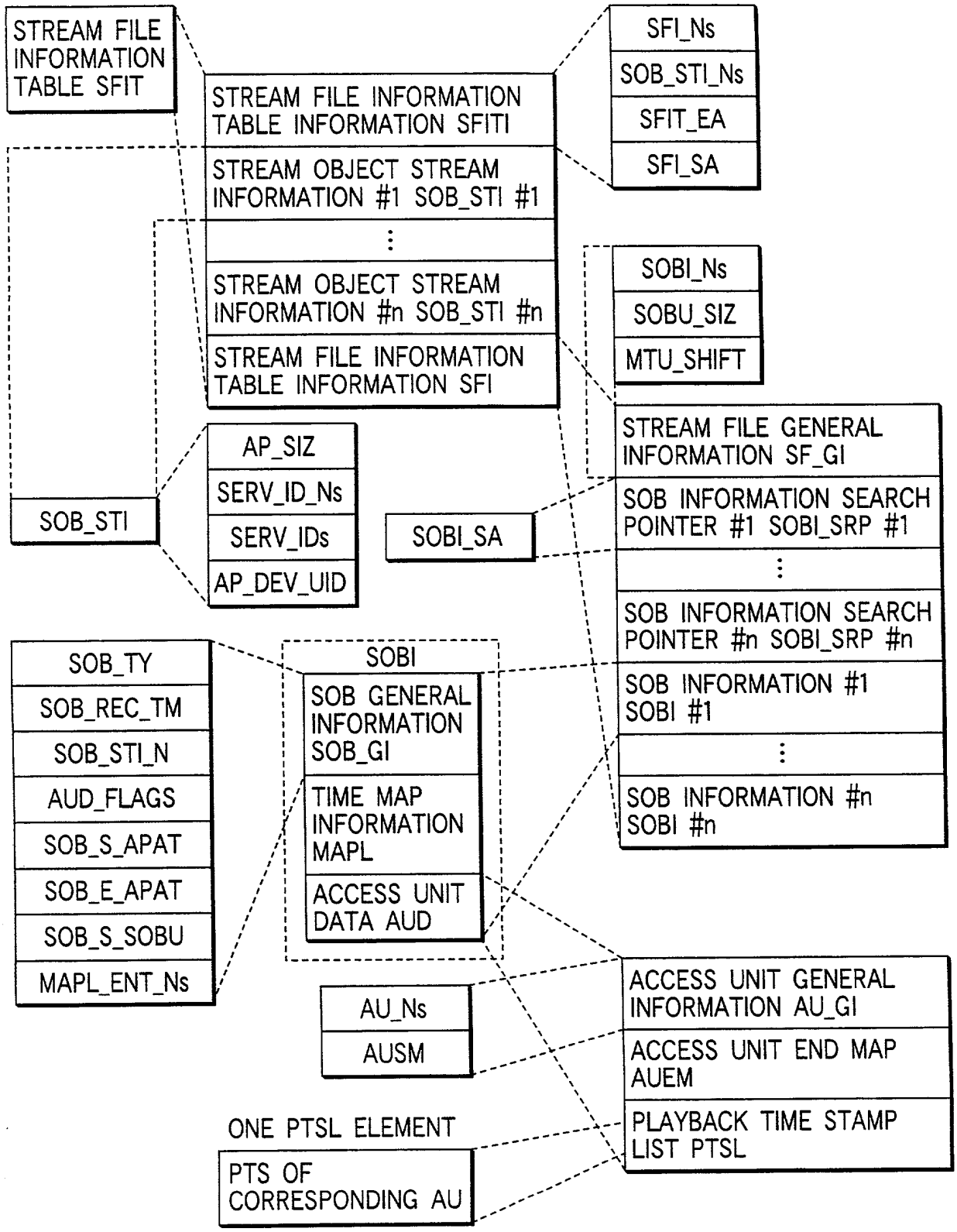

STREAM FILE INFORMATION TABLE SFIT
STREAM FILE INFORMATION TABLE INFORMATION SFITI
STREAM OBJECT STREAM INFORMATION #1 SOB_STI #1
STREAM OBJECT STREAM INFORMATION #n SOB_STI #n
STREAM FILE INFORMATION TABLE INFORMATION SFI
SFI_Ns
SOB_STI_Ns
SFIT_EA
SFI_SA
SOBI_Ns
SOBU_SIZ
MTU_SHIFT
STREAM FILE GENERAL INFORMATION SF_GI
SOB INFORMATION SEARCH POINTER #1 SOBI_SRP #1
SOB INFORMATION SEARCH POINTER #n SOBI_SRP #n
SOB INFORMATION #1 SOBI #1
SOB INFORMATION #n SOBI #n
SOB_STI
AP_SIZ
SERV_ID_Ns
SERV_IDs
AP_DEV_UID
SOBI_SA
SOBI
SOB GENERAL INFORMATION SOB_GI
TIME MAP INFORMATION MAPL
ACCESS UNIT DATA AUD
SOB_TY
SOB_REC_TM
SOB_STI_N
AUD_FLAGS
SOB_S_APAT
SOB_E_APAT
SOB_S_SOBU
MAPL_ENT_Ns
AU_Ns
AUSM
ACCESS UNIT GENERAL INFORMATION AU_GI
ACCESS UNIT END MAP AUEM
PLAYBACK TIME STAMP LIST PTSL
ONE PTSL ELEMENT
PTS OF CORRESPONDING AU

FIG. 15

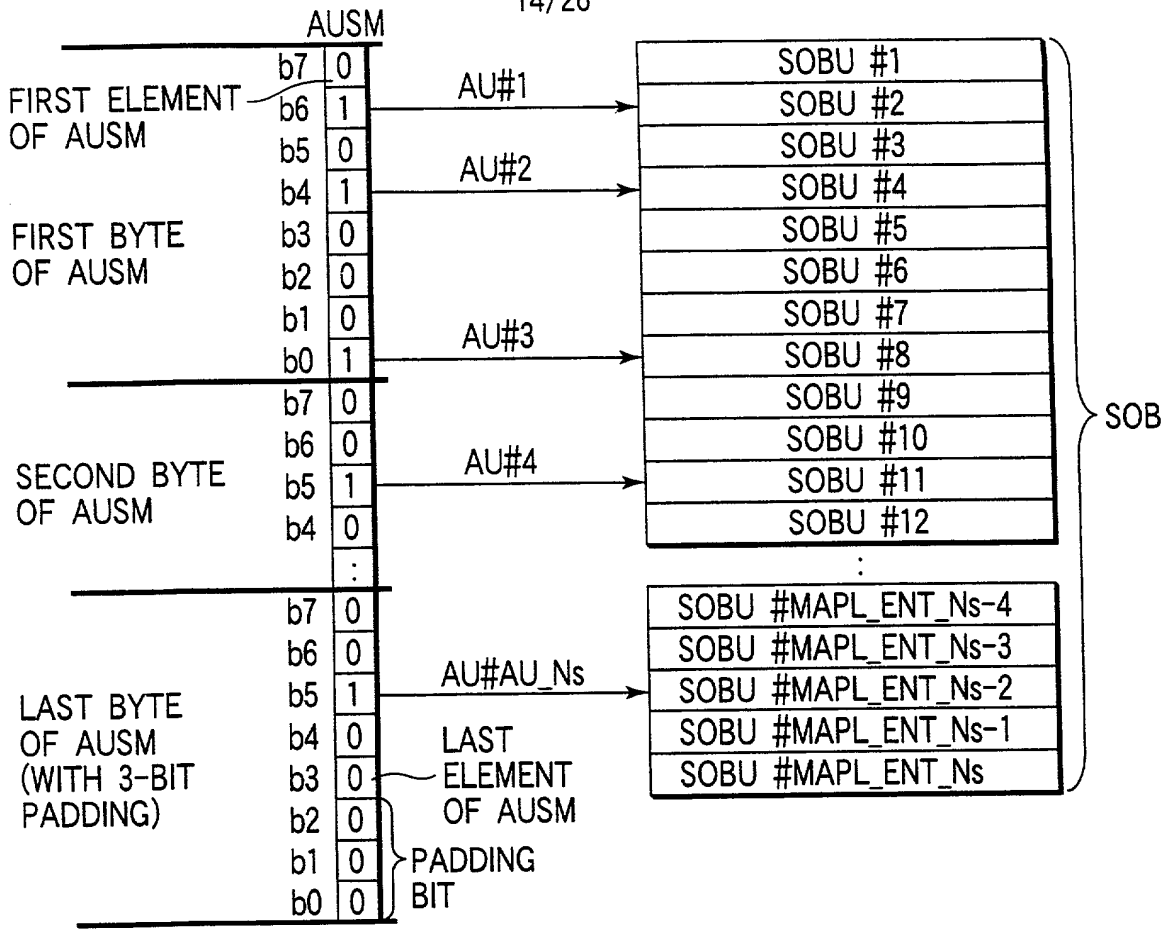

AUSM
FIRST ELEMENT OF AUSM
FIRST BYTE OF AUSM
SECOND BYTE OF AUSM
LAST BYTE OF AUSM (WITH 3-BIT PADDING)
b7 0
b6 1
b5 0
b4 1
b3 0
b2 0
b1 0
b0 1
b7 0
b6 0
b5 1
b4 0
:
b7 0
b6 0
b5 1
b4 0
b3 0
b2 0
b1 0
b0 0
AU#1
AU#2
AU#3
AU#4
AU#AU_Ns
LAST ELEMENT OF AUSM
PADDING BIT
SOBU #1
SOBU #2
SOBU #3
SOBU #4
SOBU #5
SOBU #6
SOBU #7
SOBU #8
SOBU #9
SOBU #10
SOBU #11
SOBU #12
:
SOBU #MAPL_ENT_Ns-4
SOBU #MAPL_ENT_Ns-3
SOBU #MAPL_ENT_Ns-2
SOBU #MAPL_ENT_Ns-1
SOBU #MAPL_ENT_Ns
SOB

FIG. 16

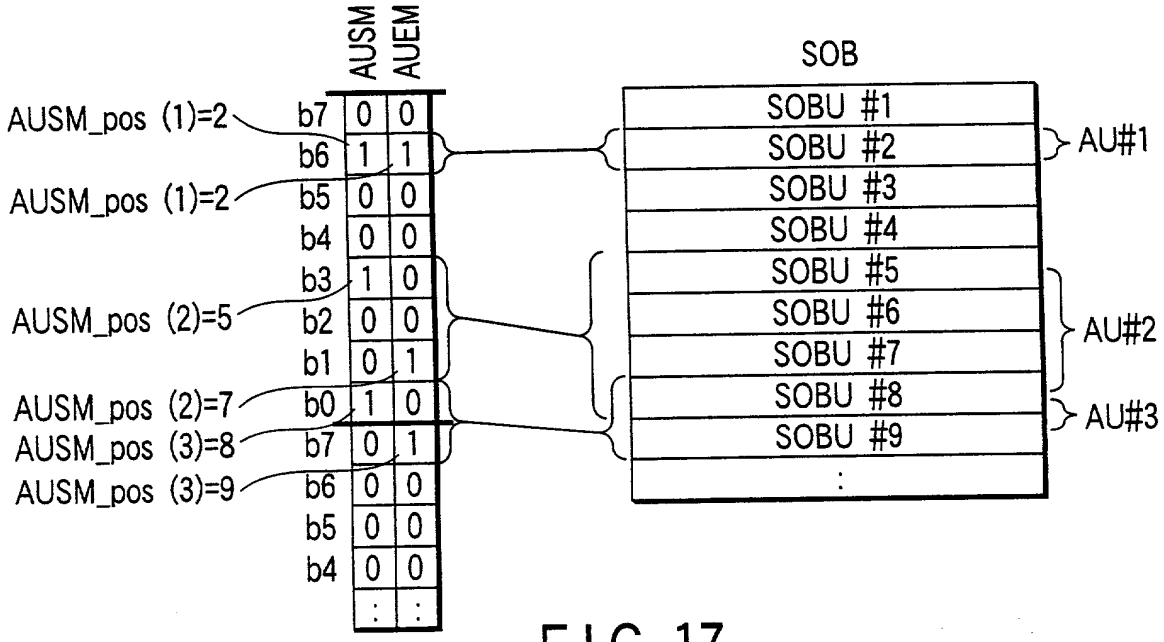

AUSM
AUEM
AUSM_pos (1)=2
AUSM_pos (1)=2
AUSM_pos (2)=5
AUSM_pos (2)=7
AUSM_pos (3)=8
AUSM_pos (3)=9
b7 0 0
b6 1 1
b5 0 0
b4 0 0
b3 1 0
b2 0 0
b1 0 1
b0 1 0
b7 0 1
b6 0 0
b5 0 0
b4 0 0
: :
SOB
SOBU #1
SOBU #2
SOBU #3
SOBU #4
SOBU #5
SOBU #6
SOBU #7
SOBU #8
SOBU #9
:
AU#1
AU#2
AU#3

FIG. 17

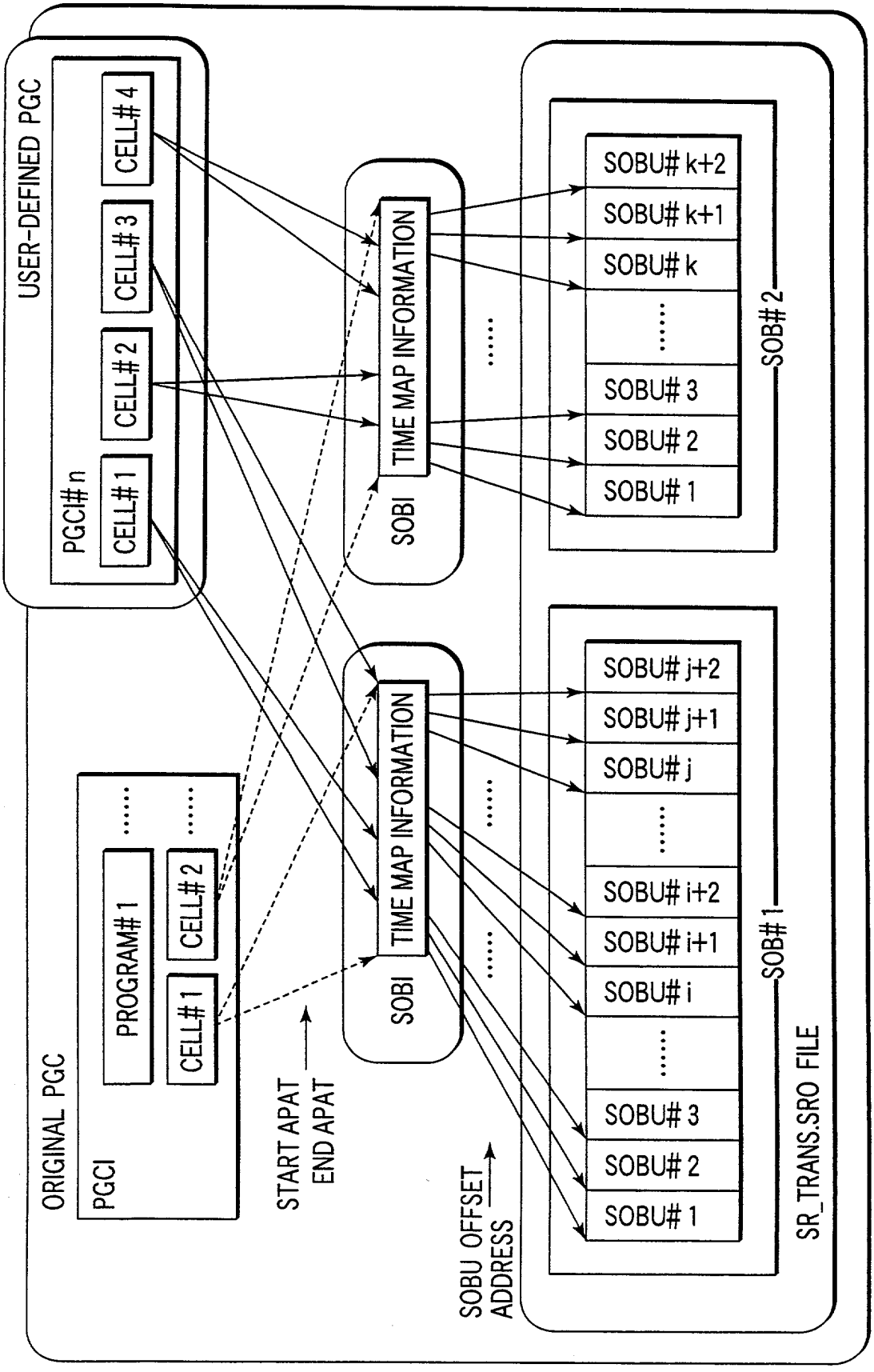

USER-DEFINED PGC
PGCI# n
CELL# 1
CELL# 2
CELL# 3
CELL# 4
ORIGINAL PGC
PGCI
PROGRAM# 1
CELL# 1
CELL# 2
START APAT
END APAT
SOBI
TIME MAP INFORMATION
SOBU OFFSET ADDRESS
SOB# 2
SOBU# k+2
SOBU# k+1
SOBU# k
SOBU# 3
SOBU# 2
SOBU# 1
SOB# 1
SOBU# j+2
SOBU# j+1
SOBU# j
SOBU# i+2
SOBU# i+1
SOBU# i
SOBU# 3
SOBU# 2
SOBU# 1
SR_TRANS.SRO FILE

FIG. 18

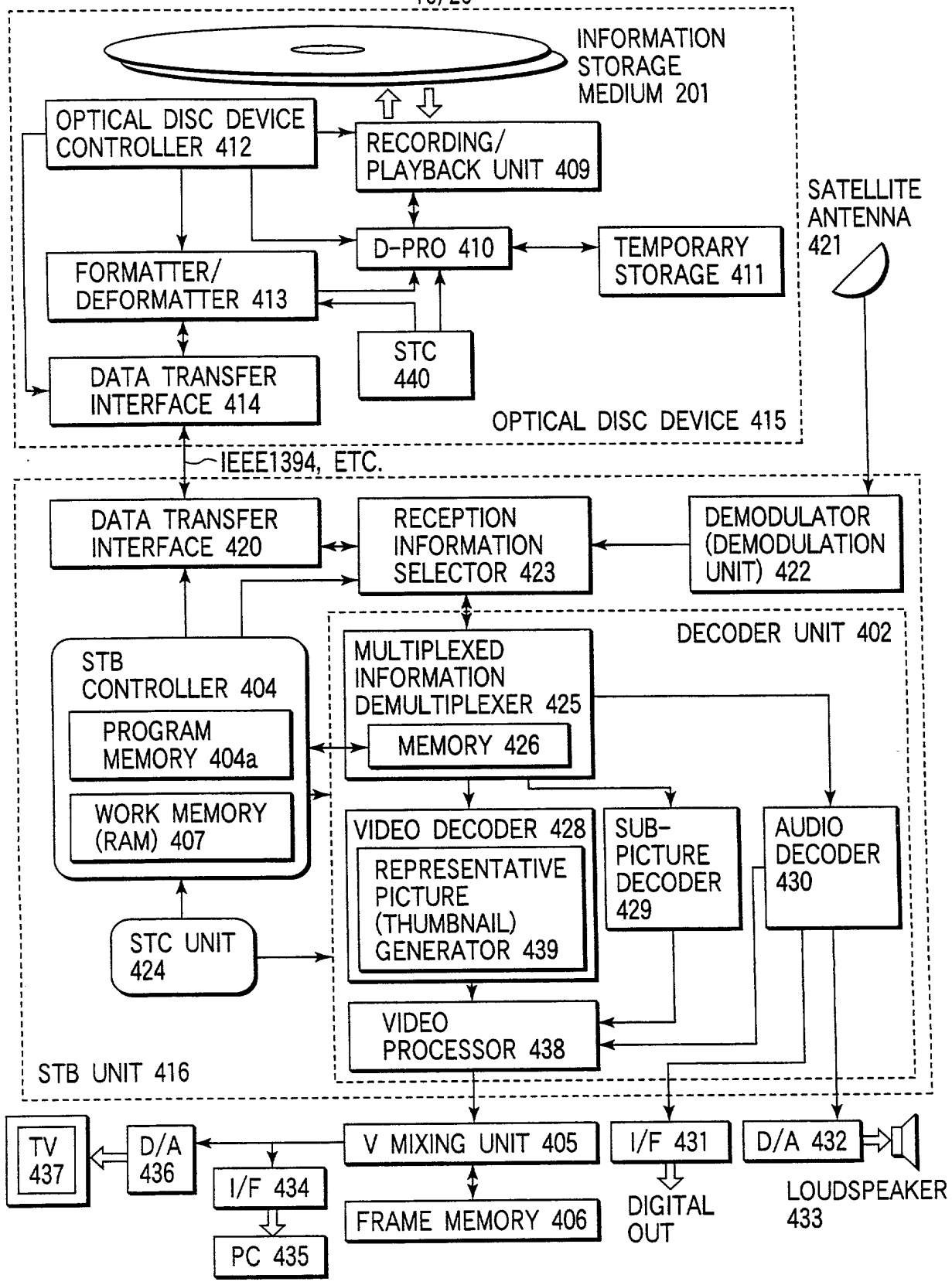

INFORMATION STORAGE MEDIUM 201
OPTICAL DISC DEVICE CONTROLLER 412
RECORDING/ PLAYBACK UNIT 409
SATELLITE ANTENNA 421
D-PRO 410
TEMPORARY STORAGE 411
FORMATTER/ DEFORMATTER 413
STC 440
DATA TRANSFER INTERFACE 414
OPTICAL DISC DEVICE 415
IEEE1394, ETC.
DATA TRANSFER INTERFACE 420
RECEPTION INFORMATION SELECTOR 423
DEMODULATOR (DEMODULATION UNIT) 422
DECODER UNIT 402
STB CONTROLLER 404
PROGRAM MEMORY 404a
WORK MEMORY (RAM) 407
MULTIPLEXED INFORMATION DEMULTIPLEXER 425
MEMORY 426
VIDEO DECODER 428
REPRESENTATIVE PICTURE (THUMBNAIL) GENERATOR 439
SUB-PICTURE DECODER 429
AUDIO DECODER 430
STC UNIT 424
VIDEO PROCESSOR 438
STB UNIT 416
TV 437
D/A 436
V MIXING UNIT 405
I/F 431
D/A 432
I/F 434
FRAME MEMORY 406
DIGITAL OUT
LOUDSPEAKER 433
PC 435

FIG. 19

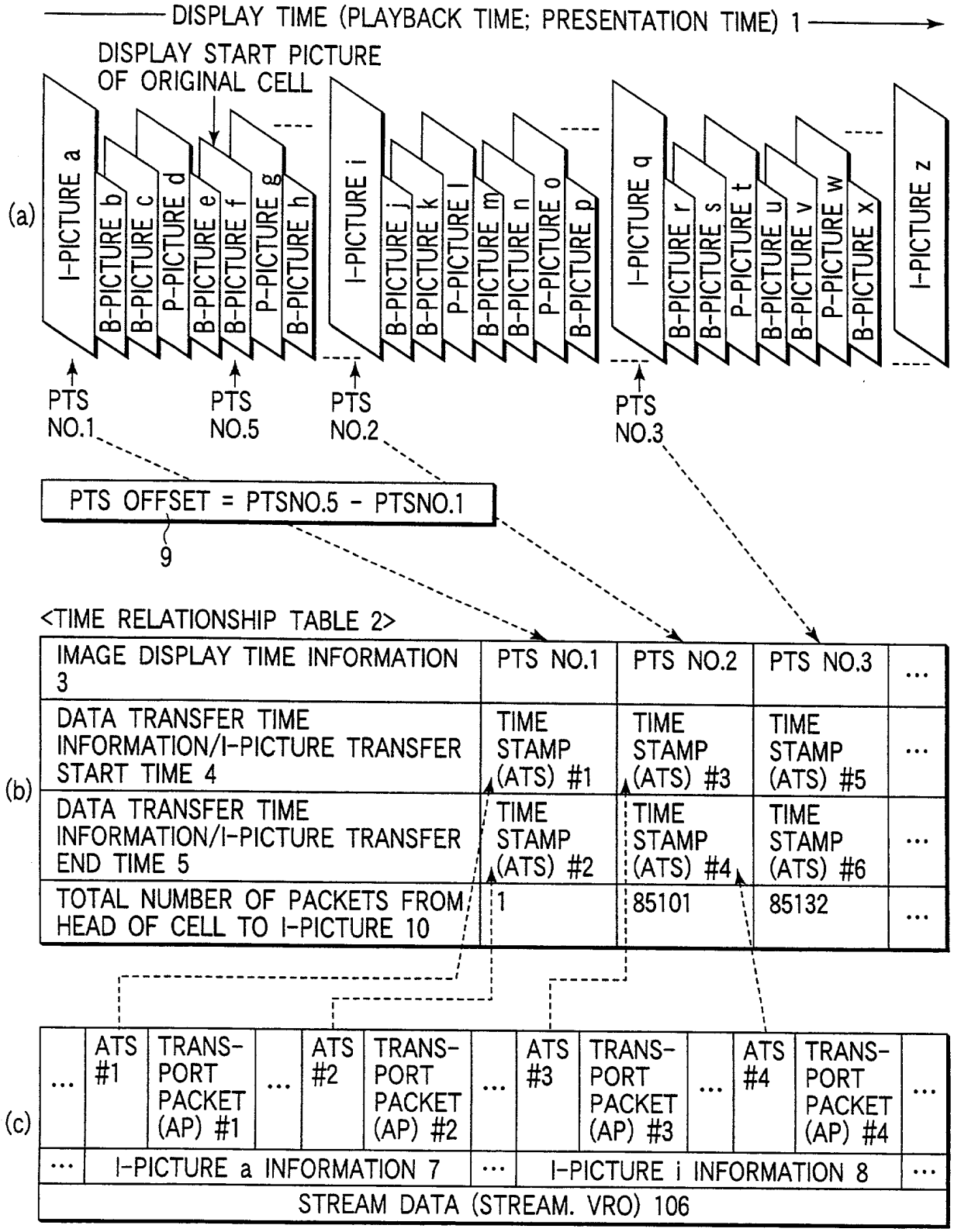

DISPLAY TIME (PLAYBACK TIME; PRESENTATION TIME) 1
DISPLAY START PICTURE OF ORIGINAL CELL
(a)
I-PICTURE a
B-PICTURE b
B-PICTURE c
P-PICTURE d
B-PICTURE e
B-PICTURE f
P-PICTURE g
B-PICTURE h
I-PICTURE i
B-PICTURE j
B-PICTURE k
P-PICTURE l
B-PICTURE m
B-PICTURE n
P-PICTURE o
B-PICTURE p
I-PICTURE q
B-PICTURE r
B-PICTURE s
P-PICTURE t
B-PICTURE u
B-PICTURE v
P-PICTURE w
B-PICTURE x
I-PICTURE z
PTS NO.1
PTS NO.5
PTS NO.2
PTS NO.3
PTS OFFSET = PTSNO.5 - PTSNO.1
9
(b)
<TIME RELATIONSHIP TABLE 2>
IMAGE DISPLAY TIME INFORMATION 3
PTS NO.1
PTS NO.2
PTS NO.3
DATA TRANSFER TIME INFORMATION/I-PICTURE TRANSFER START TIME 4
TIME STAMP (ATS) #1
TIME STAMP (ATS) #3
TIME STAMP (ATS) #5
DATA TRANSFER TIME INFORMATION/I-PICTURE TRANSFER END TIME 5
TIME STAMP (ATS) #2
TIME STAMP (ATS) #4
TIME STAMP (ATS) #6
TOTAL NUMBER OF PACKETS FROM HEAD OF CELL TO I-PICTURE 10
1
85101
85132
(c)
ATS #1
TRANS-PORT PACKET (AP) #1
ATS #2
TRANS-PORT PACKET (AP) #2
ATS #3
TRANS-PORT PACKET (AP) #3
ATS #4
TRANS-PORT PACKET (AP) #4
I-PICTURE a INFORMATION 7
I-PICTURE i INFORMATION 8
STREAM DATA (STREAM. VRO) 106

FIG. 20

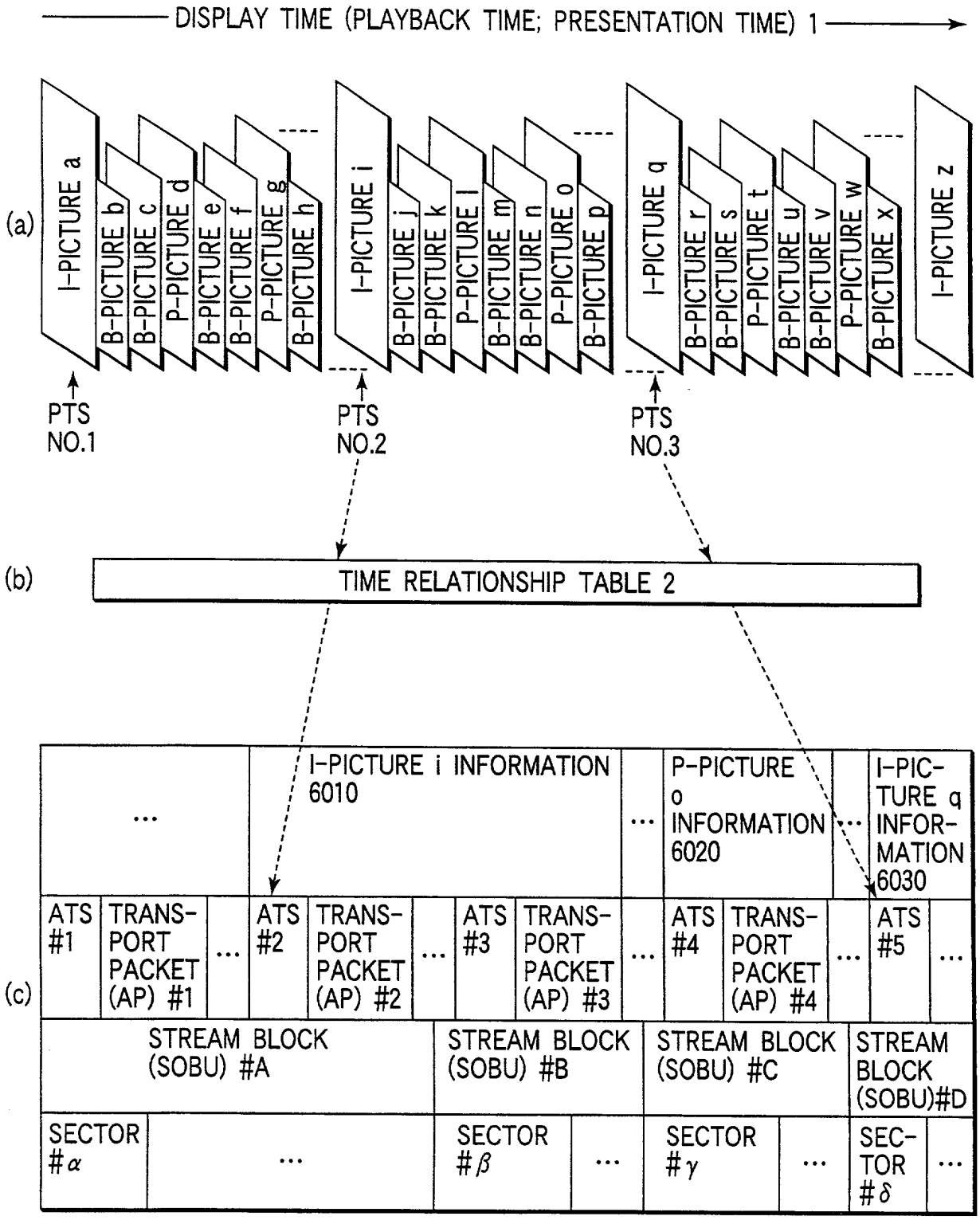

DISPLAY TIME (PLAYBACK TIME; PRESENTATION TIME) 1
(a)
I-PICTURE a
B-PICTURE b
B-PICTURE c
P-PICTURE d
B-PICTURE e
B-PICTURE f
P-PICTURE g
B-PICTURE h
I-PICTURE i
B-PICTURE j
B-PICTURE k
P-PICTURE l
B-PICTURE m
B-PICTURE n
P-PICTURE o
B-PICTURE p
I-PICTURE q
B-PICTURE r
B-PICTURE s
P-PICTURE t
B-PICTURE u
B-PICTURE v
P-PICTURE w
B-PICTURE x
I-PICTURE z
PTS NO.1
PTS NO.2
PTS NO.3
(b)
TIME RELATIONSHIP TABLE 2
(c)
I-PICTURE i INFORMATION 6010
P-PICTURE o INFORMATION 6020
I-PICTURE q INFORMATION 6030
ATS #1
TRANSPORT PACKET (AP) #1
ATS #2
TRANSPORT PACKET (AP) #2
ATS #3
TRANSPORT PACKET (AP) #3
ATS #4
TRANSPORT PACKET (AP) #4
ATS #5
STREAM BLOCK (SOBU) #A
STREAM BLOCK (SOBU) #B
STREAM BLOCK (SOBU) #C
STREAM BLOCK (SOBU)#D
SECTOR #α
SECTOR #β
SECTOR #γ
SECTOR #δ

FIG. 21

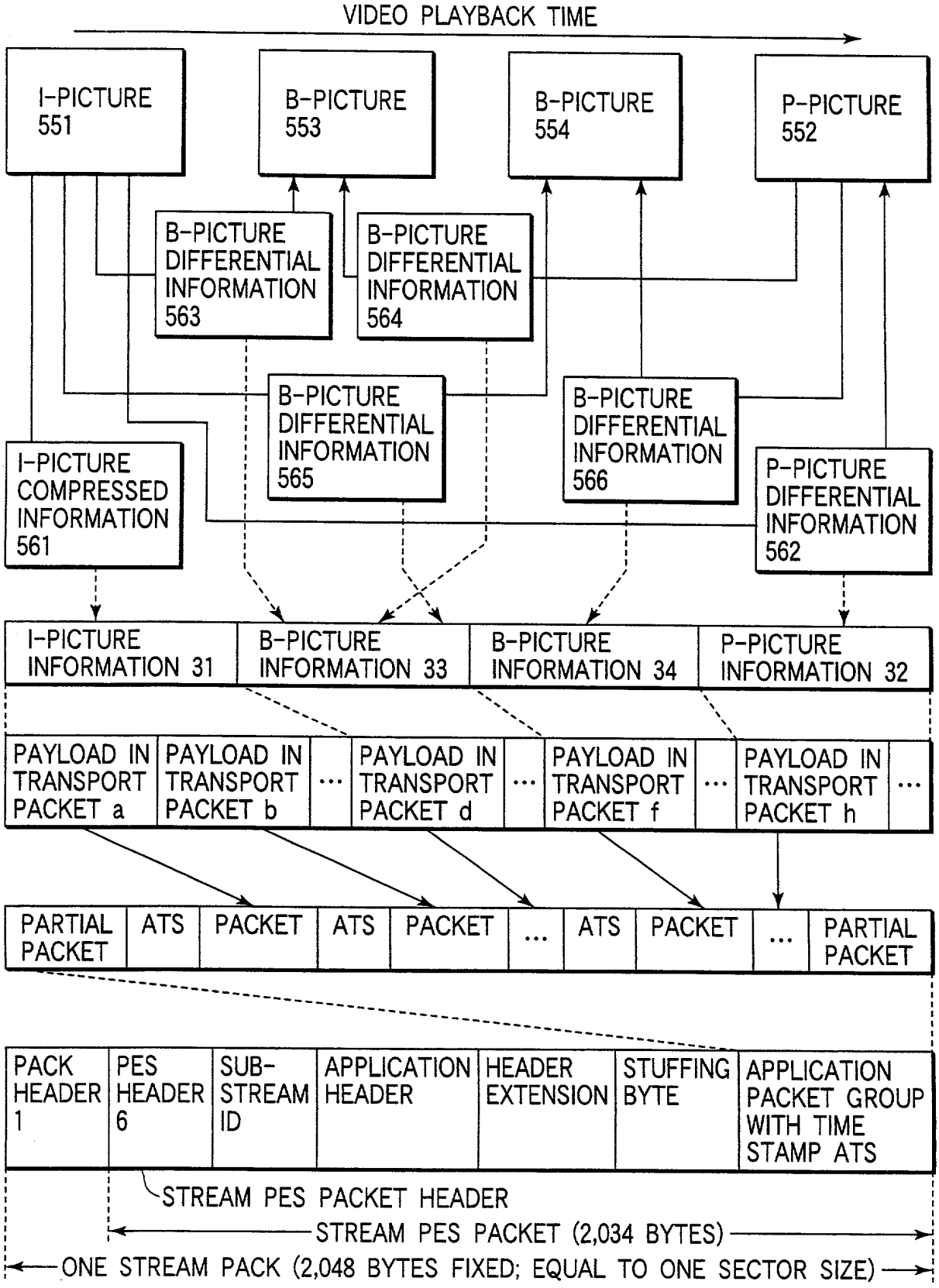

VIDEO PLAYBACK TIME
I-PICTURE 551
B-PICTURE 553
B-PICTURE 554
P-PICTURE 552
B-PICTURE DIFFERENTIAL INFORMATION 563
B-PICTURE DIFFERENTIAL INFORMATION 564
B-PICTURE DIFFERENTIAL INFORMATION 565
B-PICTURE DIFFERENTIAL INFORMATION 566
I-PICTURE COMPRESSED INFORMATION 561
P-PICTURE DIFFERENTIAL INFORMATION 562
I-PICTURE INFORMATION 31
B-PICTURE INFORMATION 33
B-PICTURE INFORMATION 34
P-PICTURE INFORMATION 32
PAYLOAD IN TRANSPORT PACKET a
PAYLOAD IN TRANSPORT PACKET b
PAYLOAD IN TRANSPORT PACKET d
PAYLOAD IN TRANSPORT PACKET f
PAYLOAD IN TRANSPORT PACKET h
PARTIAL PACKET
ATS
PACKET
PACK HEADER 1
PES HEADER 6
SUB-STREAM ID
APPLICATION HEADER
HEADER EXTENSION
STUFFING BYTE
APPLICATION PACKET GROUP WITH TIME STAMP ATS
STREAM PES PACKET HEADER
STREAM PES PACKET (2,034 BYTES)
ONE STREAM PACK (2,048 BYTES FIXED; EQUAL TO ONE SECTOR SIZE)

FIG. 22

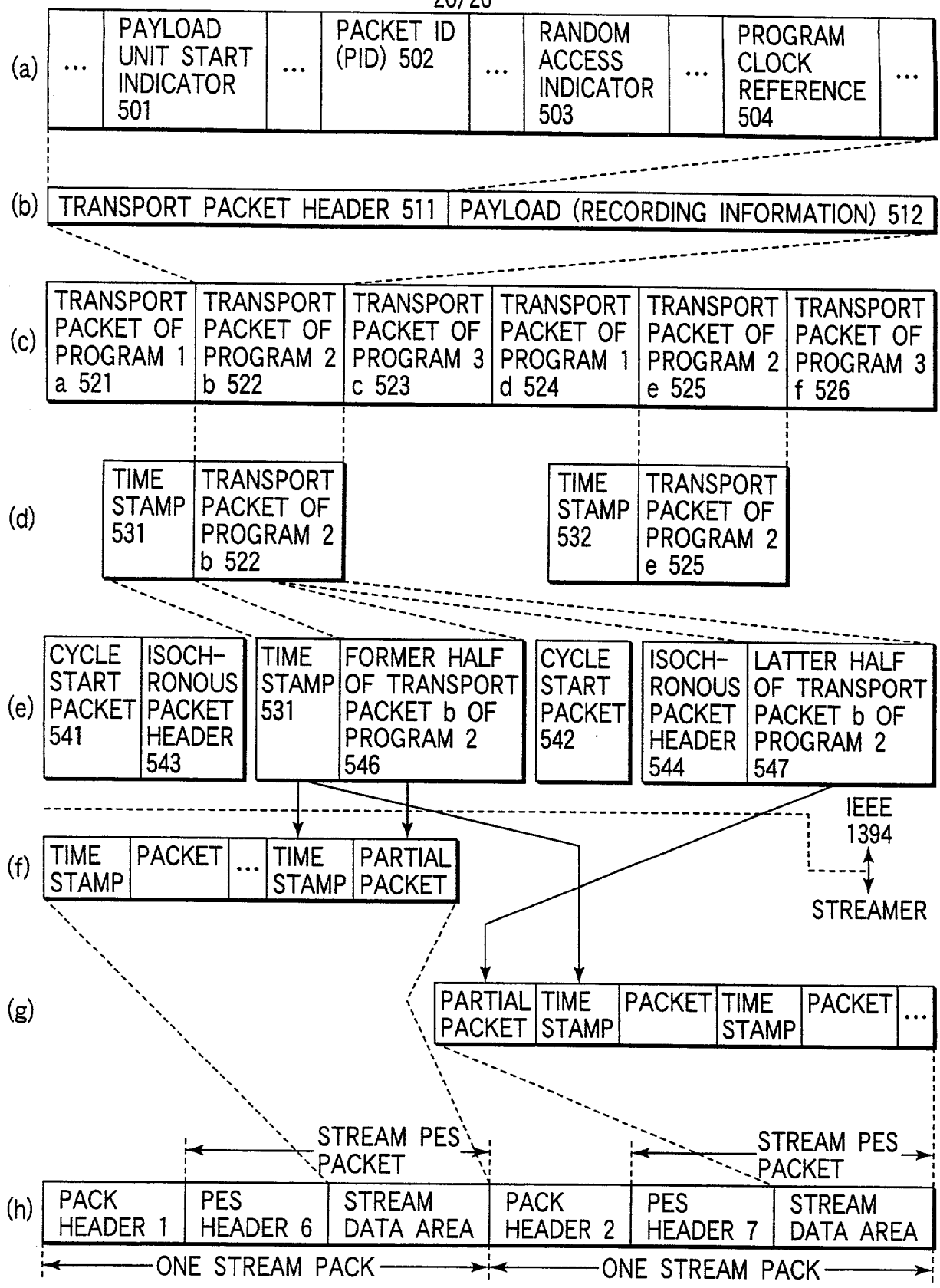

(a)
...
PAYLOAD UNIT START INDICATOR 501
...
PACKET ID (PID) 502
...
RANDOM ACCESS INDICATOR 503
...
PROGRAM CLOCK REFERENCE 504
...
(b)
TRANSPORT PACKET HEADER 511
PAYLOAD (RECORDING INFORMATION) 512
(c)
TRANSPORT PACKET OF PROGRAM 1 a 521
TRANSPORT PACKET OF PROGRAM 2 b 522
TRANSPORT PACKET OF PROGRAM 3 c 523
TRANSPORT PACKET OF PROGRAM 1 d 524
TRANSPORT PACKET OF PROGRAM 2 e 525
TRANSPORT PACKET OF PROGRAM 3 f 526
(d)
TIME STAMP 531
TRANSPORT PACKET OF PROGRAM 2 b 522
TIME STAMP 532
TRANSPORT PACKET OF PROGRAM 2 e 525
(e)
CYCLE START PACKET 541
ISOCH-RONOUS PACKET HEADER 543
TIME STAMP 531
FORMER HALF OF TRANSPORT PACKET b OF PROGRAM 2 546
CYCLE START PACKET 542
ISOCH-RONOUS PACKET HEADER 544
LATTER HALF OF TRANSPORT PACKET b OF PROGRAM 2 547
IEEE 1394
STREAMER
(f)
TIME STAMP
PACKET
...
TIME STAMP
PARTIAL PACKET
(g)
PARTIAL PACKET
TIME STAMP
PACKET
TIME STAMP
PACKET
...
STREAM PES PACKET
STREAM PES PACKET
(h)
PACK HEADER 1
PES HEADER 6
STREAM DATA AREA
PACK HEADER 2
PES HEADER 7
STREAM DATA AREA
ONE STREAM PACK
ONE STREAM PACK

FIG. 23

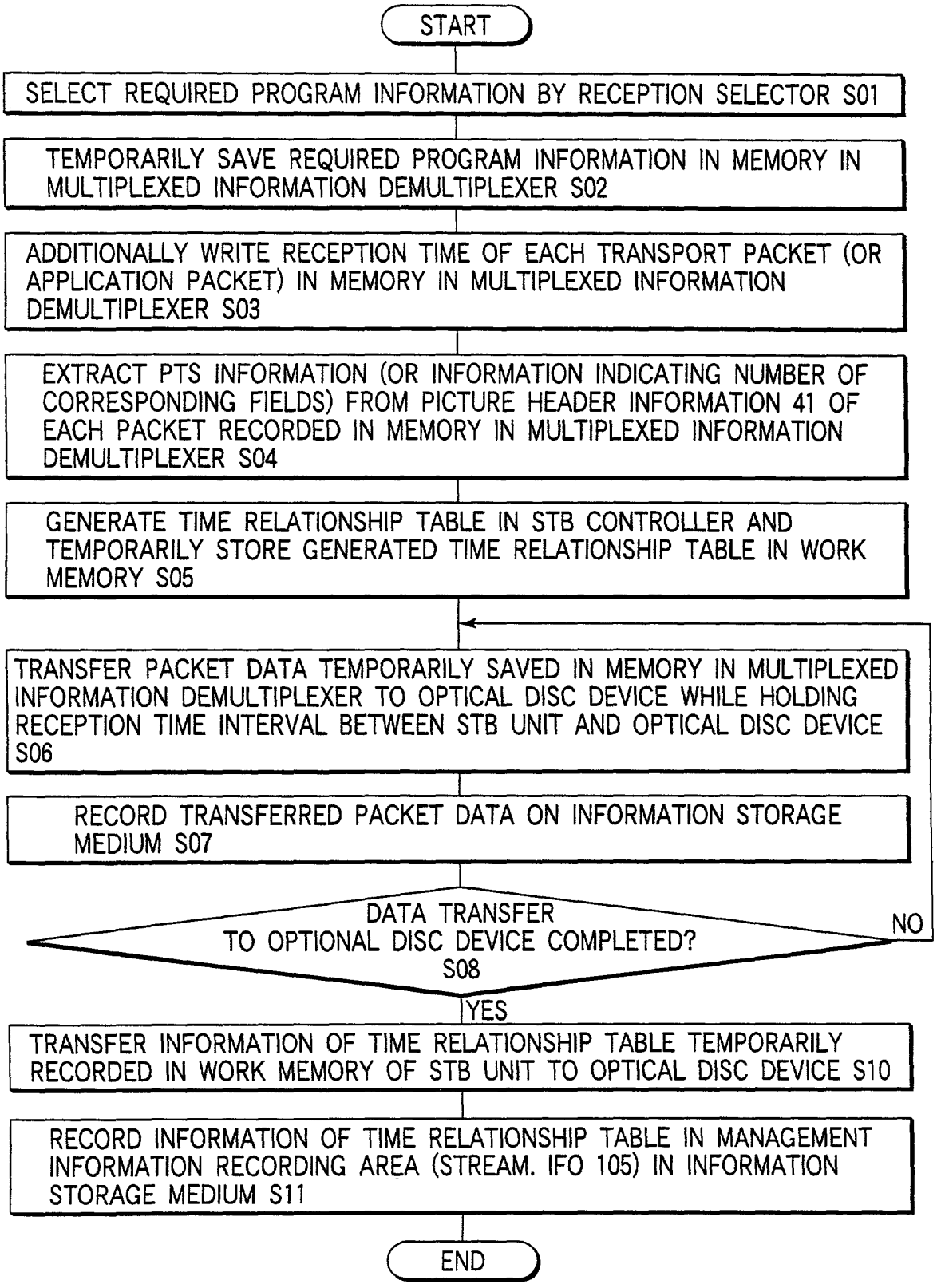

START
SELECT REQUIRED PROGRAM INFORMATION BY RECEPTION SELECTOR S01
TEMPORARILY SAVE REQUIRED PROGRAM INFORMATION IN MEMORY IN MULTIPLEXED INFORMATION DEMULTIPLEXER S02
ADDITIONALLY WRITE RECEPTION TIME OF EACH TRANSPORT PACKET (OR APPLICATION PACKET) IN MEMORY IN MULTIPLEXED INFORMATION DEMULTIPLEXER S03
EXTRACT PTS INFORMATION (OR INFORMATION INDICATING NUMBER OF CORRESPONDING FIELDS) FROM PICTURE HEADER INFORMATION 41 OF EACH PACKET RECORDED IN MEMORY IN MULTIPLEXED INFORMATION DEMULTIPLEXER S04
GENERATE TIME RELATIONSHIP TABLE IN STB CONTROLLER AND TEMPORARILY STORE GENERATED TIME RELATIONSHIP TABLE IN WORK MEMORY S05
TRANSFER PACKET DATA TEMPORARILY SAVED IN MEMORY IN MULTIPLEXED INFORMATION DEMULTIPLEXER TO OPTICAL DISC DEVICE WHILE HOLDING RECEPTION TIME INTERVAL BETWEEN STB UNIT AND OPTICAL DISC DEVICE S06
RECORD TRANSFERRED PACKET DATA ON INFORMATION STORAGE MEDIUM S07
DATA TRANSFER TO OPTIONAL DISC DEVICE COMPLETED? S08
NO
YES
TRANSFER INFORMATION OF TIME RELATIONSHIP TABLE TEMPORARILY RECORDED IN WORK MEMORY OF STB UNIT TO OPTICAL DISC DEVICE S10
RECORD INFORMATION OF TIME RELATIONSHIP TABLE IN MANAGEMENT INFORMATION RECORDING AREA (STREAM. IFO 105) IN INFORMATION STORAGE MEDIUM S11
END

FIG. 24

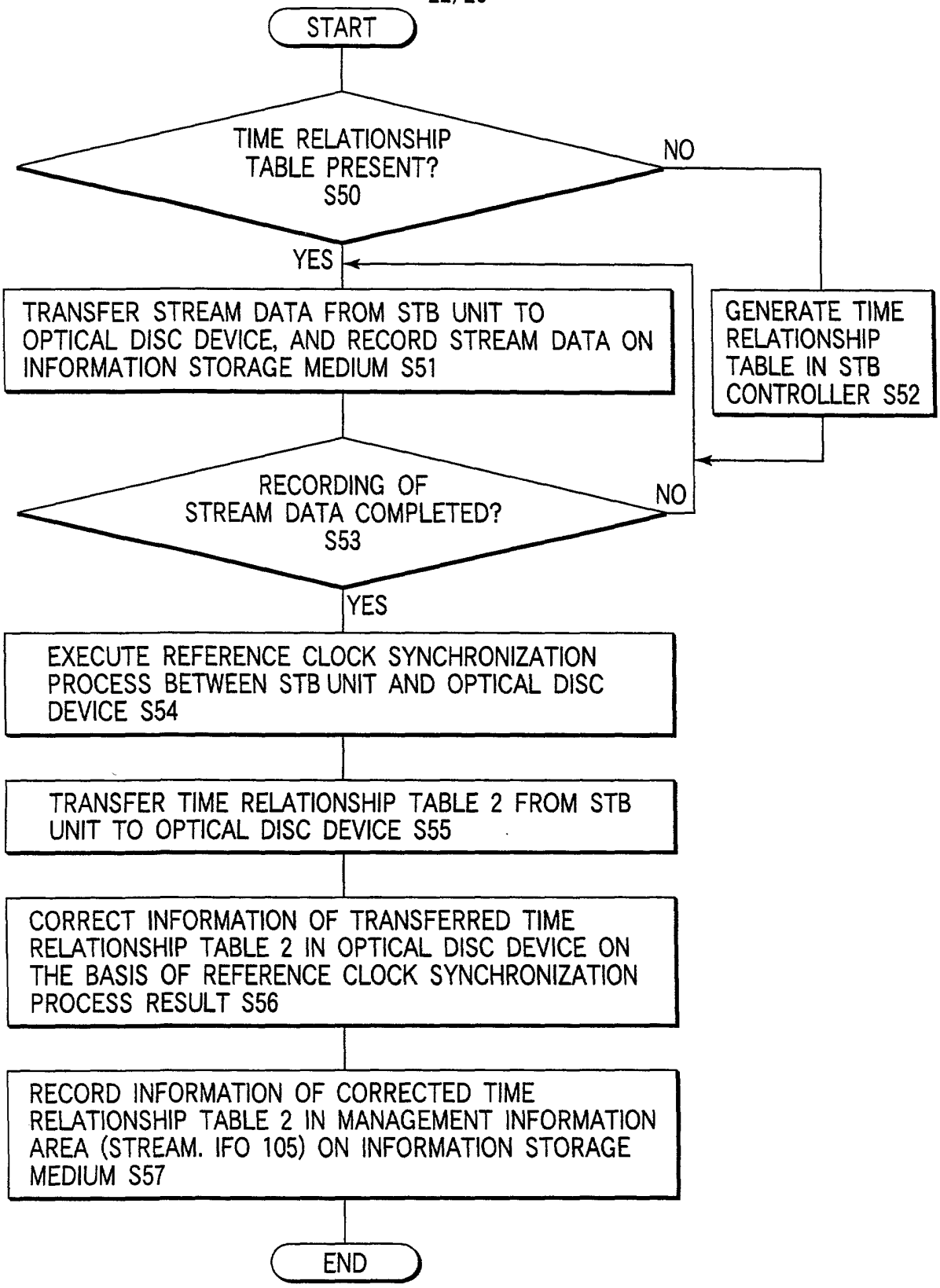

START
TIME RELATIONSHIP TABLE PRESENT? S50
NO
YES
TRANSFER STREAM DATA FROM STB UNIT TO OPTICAL DISC DEVICE, AND RECORD STREAM DATA ON INFORMATION STORAGE MEDIUM S51
GENERATE TIME RELATIONSHIP TABLE IN STB CONTROLLER S52
RECORDING OF STREAM DATA COMPLETED? S53
NO
YES
EXECUTE REFERENCE CLOCK SYNCHRONIZATION PROCESS BETWEEN STB UNIT AND OPTICAL DISC DEVICE S54
TRANSFER TIME RELATIONSHIP TABLE 2 FROM STB UNIT TO OPTICAL DISC DEVICE S55
CORRECT INFORMATION OF TRANSFERRED TIME RELATIONSHIP TABLE 2 IN OPTICAL DISC DEVICE ON THE BASIS OF REFERENCE CLOCK SYNCHRONIZATION PROCESS RESULT S56
RECORD INFORMATION OF CORRECTED TIME RELATIONSHIP TABLE 2 IN MANAGEMENT INFORMATION AREA (STREAM. IFO 105) ON INFORMATION STORAGE MEDIUM S57
END

FIG. 25

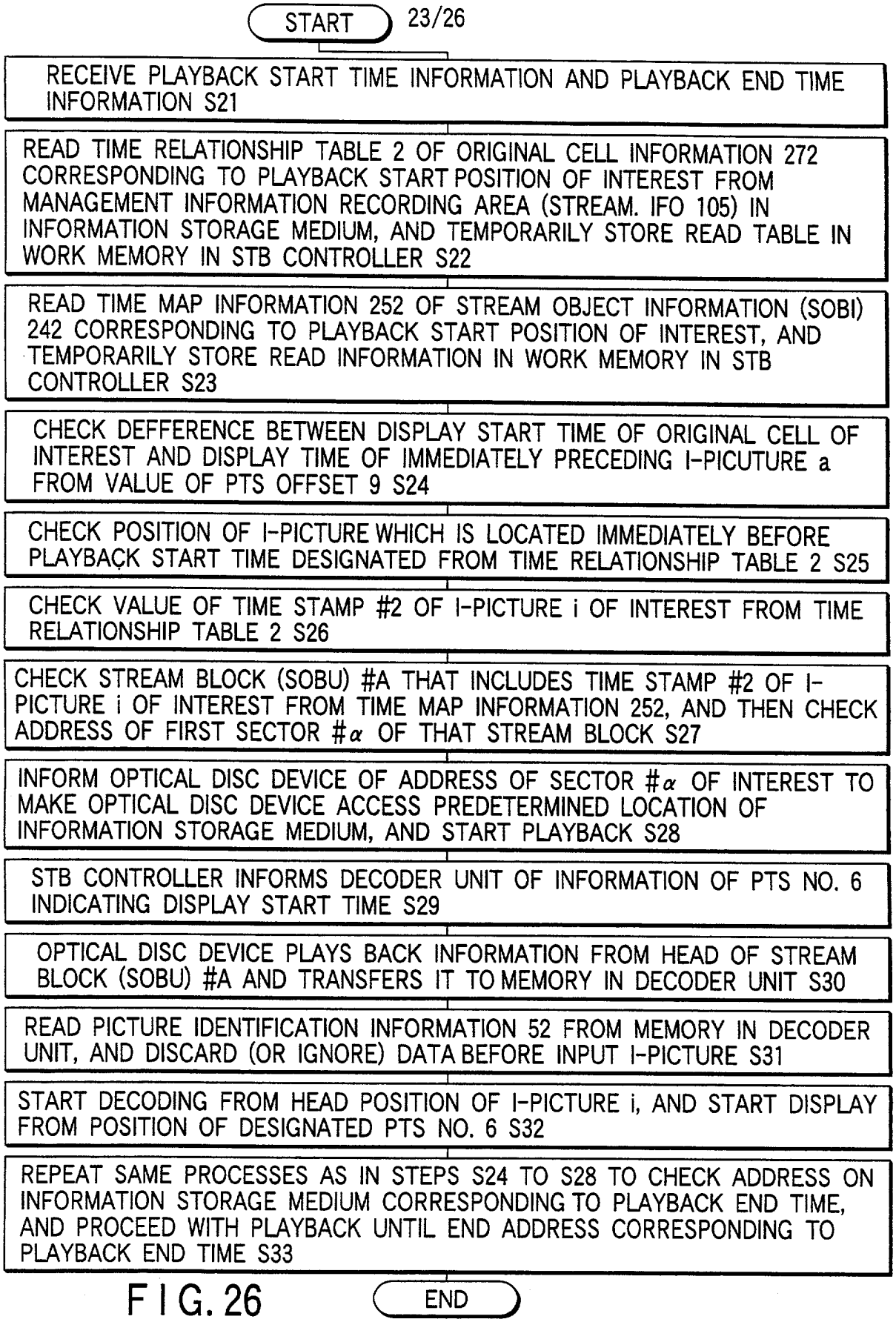

START
23/26
RECEIVE PLAYBACK START TIME INFORMATION AND PLAYBACK END TIME INFORMATION S21
READ TIME RELATIONSHIP TABLE 2 OF ORIGINAL CELL INFORMATION 272 CORRESPONDING TO PLAYBACK START POSITION OF INTEREST FROM MANAGEMENT INFORMATION RECORDING AREA (STREAM. IFO 105) IN INFORMATION STORAGE MEDIUM, AND TEMPORARILY STORE READ TABLE IN WORK MEMORY IN STB CONTROLLER S22
READ TIME MAP INFORMATION 252 OF STREAM OBJECT INFORMATION (SOBI) 242 CORRESPONDING TO PLAYBACK START POSITION OF INTEREST, AND TEMPORARILY STORE READ INFORMATION IN WORK MEMORY IN STB CONTROLLER S23
CHECK DEFFERENCE BETWEEN DISPLAY START TIME OF ORIGINAL CELL OF INTEREST AND DISPLAY TIME OF IMMEDIATELY PRECEDING I-PICUTURE a FROM VALUE OF PTS OFFSET 9 S24
CHECK POSITION OF I-PICTURE WHICH IS LOCATED IMMEDIATELY BEFORE PLAYBACK START TIME DESIGNATED FROM TIME RELATIONSHIP TABLE 2 S25
CHECK VALUE OF TIME STAMP #2 OF I-PICTURE i OF INTEREST FROM TIME RELATIONSHIP TABLE 2 S26
CHECK STREAM BLOCK (SOBU) #A THAT INCLUDES TIME STAMP #2 OF I-PICTURE i OF INTEREST FROM TIME MAP INFORMATION 252, AND THEN CHECK ADDRESS OF FIRST SECTOR #α OF THAT STREAM BLOCK S27
INFORM OPTICAL DISC DEVICE OF ADDRESS OF SECTOR #α OF INTEREST TO MAKE OPTICAL DISC DEVICE ACCESS PREDETERMINED LOCATION OF INFORMATION STORAGE MEDIUM, AND START PLAYBACK S28
STB CONTROLLER INFORMS DECODER UNIT OF INFORMATION OF PTS NO. 6 INDICATING DISPLAY START TIME S29
OPTICAL DISC DEVICE PLAYS BACK INFORMATION FROM HEAD OF STREAM BLOCK (SOBU) #A AND TRANSFERS IT TO MEMORY IN DECODER UNIT S30
READ PICTURE IDENTIFICATION INFORMATION 52 FROM MEMORY IN DECODER UNIT, AND DISCARD (OR IGNORE) DATA BEFORE INPUT I-PICTURE S31
START DECODING FROM HEAD POSITION OF I-PICTURE i, AND START DISPLAY FROM POSITION OF DESIGNATED PTS NO. 6 S32
REPEAT SAME PROCESSES AS IN STEPS S24 TO S28 TO CHECK ADDRESS ON INFORMATION STORAGE MEDIUM CORRESPONDING TO PLAYBACK END TIME, AND PROCEED WITH PLAYBACK UNTIL END ADDRESS CORRESPONDING TO PLAYBACK END TIME S33
END

FIG. 26

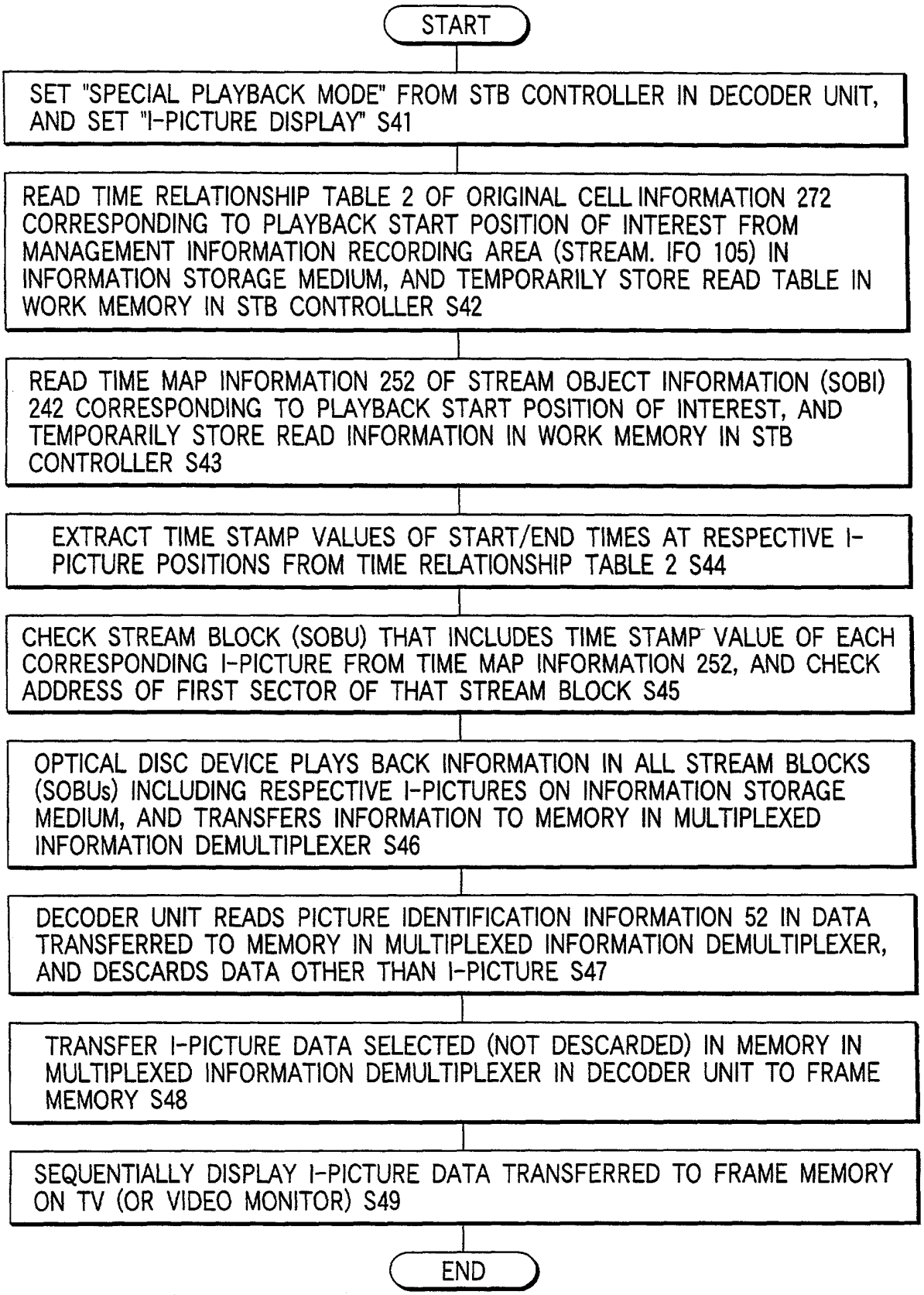
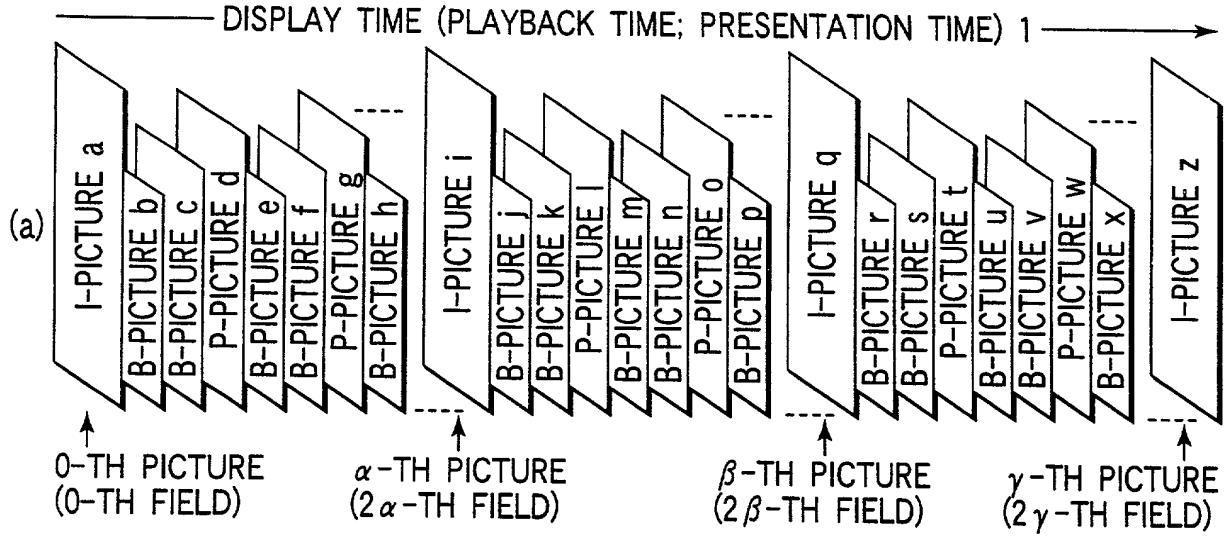

START
SET "SPECIAL PLAYBACK MODE" FROM STB CONTROLLER IN DECODER UNIT, AND SET "I-PICTURE DISPLAY" S41
READ TIME RELATIONSHIP TABLE 2 OF ORIGINAL CELL INFORMATION 272 CORRESPONDING TO PLAYBACK START POSITION OF INTEREST FROM MANAGEMENT INFORMATION RECORDING AREA (STREAM. IFO 105) IN INFORMATION STORAGE MEDIUM, AND TEMPORARILY STORE READ TABLE IN WORK MEMORY IN STB CONTROLLER S42
READ TIME MAP INFORMATION 252 OF STREAM OBJECT INFORMATION (SOBI) 242 CORRESPONDING TO PLAYBACK START POSITION OF INTEREST, AND TEMPORARILY STORE READ INFORMATION IN WORK MEMORY IN STB CONTROLLER S43
EXTRACT TIME STAMP VALUES OF START/END TIMES AT RESPECTIVE I-PICTURE POSITIONS FROM TIME RELATIONSHIP TABLE 2 S44
CHECK STREAM BLOCK (SOBU) THAT INCLUDES TIME STAMP VALUE OF EACH CORRESPONDING I-PICTURE FROM TIME MAP INFORMATION 252, AND CHECK ADDRESS OF FIRST SECTOR OF THAT STREAM BLOCK S45
OPTICAL DISC DEVICE PLAYS BACK INFORMATION IN ALL STREAM BLOCKS (SOBUs) INCLUDING RESPECTIVE I-PICTURES ON INFORMATION STORAGE MEDIUM, AND TRANSFERS INFORMATION TO MEMORY IN MULTIPLEXED INFORMATION DEMULTIPLEXER S46
DECODER UNIT READS PICTURE IDENTIFICATION INFORMATION 52 IN DATA TRANSFERRED TO MEMORY IN MULTIPLEXED INFORMATION DEMULTIPLEXER, AND DESCARDS DATA OTHER THAN I-PICTURE S47
TRANSFER I-PICTURE DATA SELECTED (NOT DESCARDED) IN MEMORY IN MULTIPLEXED INFORMATION DEMULTIPLEXER IN DECODER UNIT TO FRAME MEMORY S48
SEQUENTIALLY DISPLAY I-PICTURE DATA TRANSFERRED TO FRAME MEMORY ON TV (OR VIDEO MONITOR) S49
END

FIG. 27



(b)

...	I-PICTURE a INFORMATION 6040	...	I-PICTURE i INFORMATION 6010	...	I-PICTURE q INFORMATION 6030	...	I-PICTURE z INFORMATION 6050
	GOP#1		GOP#2		GOP#3		GOP#4
STREAM BLOCK (SOBU) NO.0	STREAM BLOCK (SOBU) NO.1	...	STREAM BLOCK (SOBU) NO.4	...	STREAM BLOCK (SOBU) NO.10	...	STREAM BLOCK (SOBU) NO.15

GOP END MATCHING

(c)

<TIME RELATIONSHIP TABLE 6>

NUMBER OF DISPLAY FIELDS IN GOP	2α	2β-2α	2γ-2β	...
NUMBER OF STREAM BLOCKS (SOBUs) OCCUPIED IN UNITS OF GOPs	5 (STREAM BLOCKS)	6 (STREAM BLOCKS)	5 (STREAM BLOCKS)	...
GOP END MATCHING FLAG	"0"	"1"	"0"	...
I-PICTURE SIZE IN GOP	30 SECTORS	28 SECTORS	32 SECTORS	...

FIG. 28

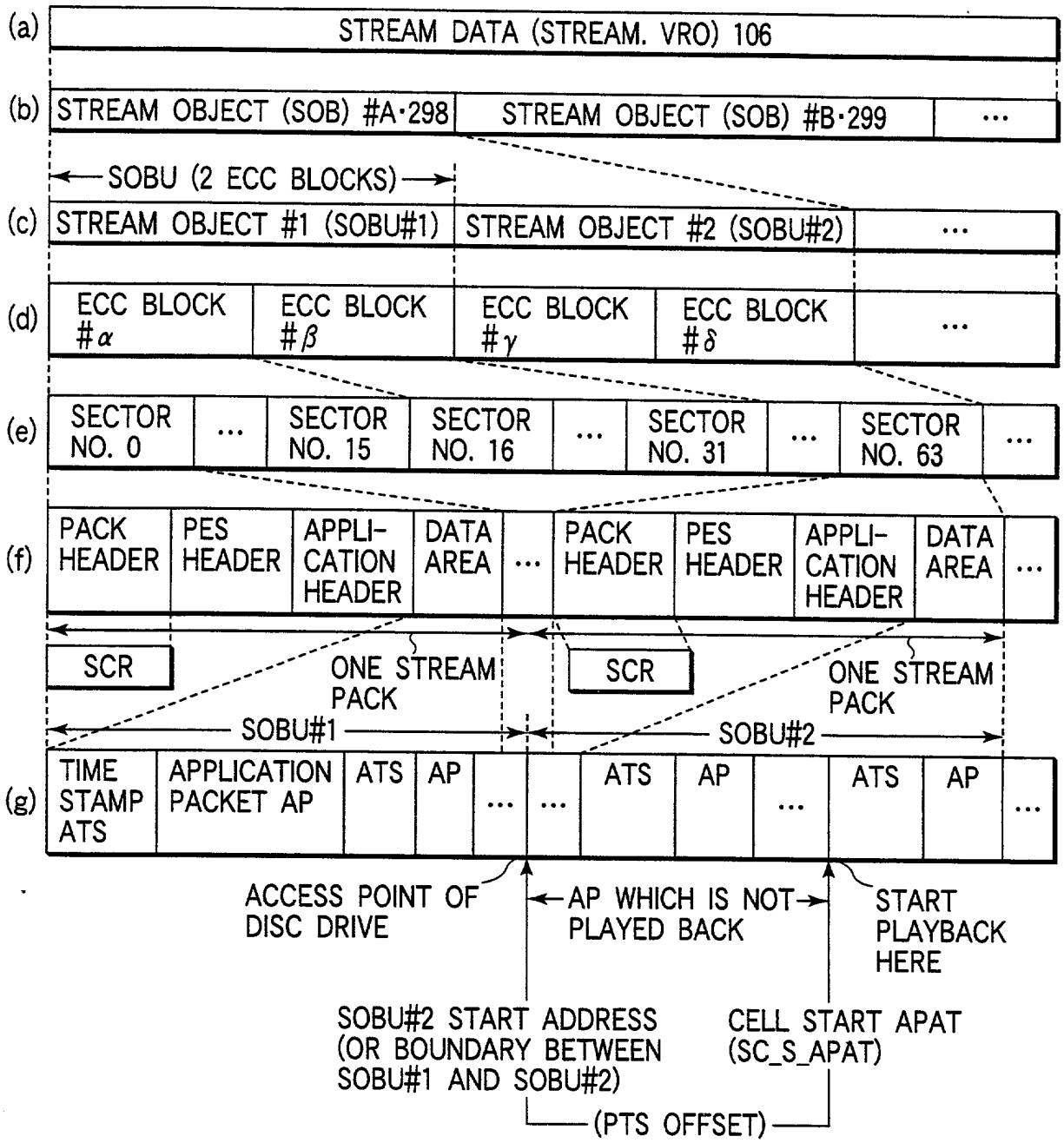

(a)
STREAM DATA (STREAM. VRO) 106
(b)
STREAM OBJECT (SOB) #A·298
STREAM OBJECT (SOB) #B·299
...
SOBU (2 ECC BLOCKS)
(c)
STREAM OBJECT #1 (SOBU#1)
STREAM OBJECT #2 (SOBU#2)
...
(d)
ECC BLOCK #α
ECC BLOCK #β
ECC BLOCK #γ
ECC BLOCK #δ
...
(e)
SECTOR NO. 0
SECTOR NO. 15
SECTOR NO. 16
SECTOR NO. 31
SECTOR NO. 63
(f)
PACK HEADER
PES HEADER
APPLI-CATION HEADER
DATA AREA
SCR
ONE STREAM PACK
SOBU#1
SOBU#2
(g)
TIME STAMP ATS
APPLICATION PACKET AP
ATS
AP
ACCESS POINT OF DISC DRIVE
AP WHICH IS NOT PLAYED BACK
START PLAYBACK HERE
SOBU#2 START ADDRESS (OR BOUNDARY BETWEEN SOBU#1 AND SOBU#2)
CELL START APAT (SC_S_APAT)
(PTS OFFSET)

FIG. 29